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Agricultural Progress in the Third World and its Effect on U.S. Farm Exports

A SPECIAL STUDY

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AGRICULTURAL PROGRESS IN THE THIRD WORLD AND ITS EFFECT ON U.S. FARM EXPORTS

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NOTE

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PREFACE

An important goal of U.S. foreign aid and development policies over the last several decades has been to help developing countries advance their economic welfare and political stability by improving conditions in agriculture. Some observers believe these policies may create obstacles to the expansion of U.S. agricultural exports. At the request of the Senate Budget Committee, this special study identifies the major factors that affect agricultural production in developing countries, assesses the influence of U.S. policies, and evaluates how changes in agricultural conditions in developing countries may affect U.S. exports of farm commodities. In keeping with the mandate of the Congressional Budget Office (CBO) to provide nonpartisan analysis, the study makes no recommendations.

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SUMMARY AND CONCLUSIONS

Like other sectors of the U.S. economy, agriculture depends increasingly on trade with developing countries--that is, the more than 100 countries that have not yet become fully modern and industrialized. Exports of farm products to developing countries have grown fivefold since 1970, representing about 41 percent of all U.S. agricultural exports in 1987. Developing countries buy more than two-thirds of U.S. exports of food grains. Such trade is expected to become even more important in the future.

This report centers on food. Food policy is the primary focus of agricultural policy in most developing countries, and food products are the main agricultural imports of developing countries and the principal agricultural exports of the United States.

Recent research has found that many developing countries tend to increase their imports of food as their agriculture develops. Two key relationships hold here: advances in agricultural efficiency, often accompanied by greater agricultural output, contribute to overall economic growth and higher incomes; in turn, higher incomes stimulate the demand for food. In many cases, the demand for food grows faster than the supply of food, resulting in greater food imports. These linkages help explain the apparent paradox that impressive gains in agricultural production by developing countries overall have been accompanied by solid growth in their agricultural imports--and notably in their imports of U.S. farm products. The evidence argues strongly that the encouragement of economic growth in developing countries, including (and in many cases especially) agricultural development makes sense not only from the humanitarian and foreign policy standpoints but also in the narrower terms of U.S. economic interests. These generalizations represent a view now widely held by development economists.

These general relationships among agricultural development, food imports, and economic assistance do not hold for all developing countries, or for all types of agricultural commodities. Developing countries differ in many ways. Some of them have a natural comparative advantage in agriculture, while in others farming is relatively costly compared with other types of economic activity. Again, in most countries at early stages of development, agriculture is the livelihood of most of the population and so further development is predicated on improvements in agricultural productivity. This holds for most countries in Sub-Saharan Africa and the poorest countries in Asia and Latin America. Agriculture also plays a major role in several of the advanced developing countries where it is a naturally profitable activity, as in Brazil, Argentina, Malaysia, and Thailand. On the other hand, many developing countries (for example, Korea and Taiwan) rely heavily on their industrial and service sectors, in some cases protecting relatively inefficient farmers much as do some developed countries. Agriculture plays a comparatively small part in the development of such countries. Though many of them are major food importers, there is no evidence that an increase in agricultural productivity or output would significantly reduce their demand for food imports.

The development of profitable crops in the Third World may affect some international markets. Growth of soybean production in the southern cone of Latin America and of palm oil production in Southeast Asia have had an important impact on world soybean and vegetable oil markets (increasing competitive pressures on U.S. soybean producers). In the case of food grains such as wheat and rice, the record is mixed. Some developing countries have increased both their production and imports of a commodity, while other countries such as Indonesia (rice) and India (wheat) have seen growing domestic production displace imports. In feed grains, developing countries have almost uniformly increased their imports.

Thus, as might be expected, any generalization about such a wide range of countries and commodities will have its exceptions. The fact remains that most developing countries' agricultural imports have increased considerably over the last two decades, especially those of the rapidly growing advanced countries. Often, where a country has reduced its import (or expanded its export) of one crop, it has concurrently expanded the import of some other agricultural product. Thus, India is a large importer of vegetable oil, while Brazil and Indonesia are major importers of wheat. If one considers all grains together, developing countries have in general become less, not more, self-sufficient, increasing their reliance on grain imports from developed countries. This increase implies that markets for U.S. agricultural exports are likely to be enhanced rather than injured by agricultural progress and economic growth in developing countries.

U.S. government policies influence agriculture in developing countries through a variety of channels. The most obvious is direct assistance to foreign agriculture. Most U.S. direct assistance (as well as that of the multilateral development agencies such as the World Bank, which receive U.S. contributions) goes to low- and lower-middle-income developing countries. Recent reexaminations of development aid policies (by the Agency for International Development and by the Congress) suggest that current aid efforts are not effectively assisting economic development or meeting other program goals. The authors of these studies suggest a reorientation of U.S. aid policies, placing an emphasis on the need of recipient countries to maintain sound economic policies of their own.

Another channel of U.S. influence is through domestic macroeconomic policies that affect world economic activity in a general way. These policies may be of signal importance to the more advanced developed countries, many of which have benefited from U.S. aid in the past. These countries are now able to carry out their own agricultural programs, and to purchase new technology on the world market. Their success in doing so may depend on how U.S. economic policies affect the world economy, rather than on foreign aid programs. Specifically, these advanced developing countries are sensitive to trade flows, interest rates, commodity rates, commodity prices, the value of the dollar, and freedom of access to key U.S. markets.

ECONOMIC GROWTH AND AGRICULTURAL TRENDS IN DEVELOPING COUNTRIES

Developing countries vary widely in resources, climate, population, and in their political, cultural, and religious traditions. Some have achieved striking economic growth over the last several generations (Korea, Taiwan, and Brazil), while others have lingered in economic stagnation and poverty (most of Sub-Saharan Africa). The gap between different groups of developing countries is widening as the newly industrialized countries pull away from the truly poor of the world. The world recession of the early 1980s, and the subsequent debt crisis and weakness in oil and other commodity prices, raised barriers to the progress of all but the most resilient developing countries.

Despite these difficulties, developing countries have made great strides in expanding agricultural production and consumption over the last several decades. Not all have been successful, however: famine has struck repeatedly in several sub-Saharan African countries, and hundreds of millions of people throughout the third world remain undernourished. Even with the impressive gains in food production of the last 25 years, much of the increase in per capita food consumption was supplied by imports from developed countries. Most developing countries are becoming steadily less self-sufficient in supplying their people with food, as population growth and income growth and urbanization expand the demand for food faster than their farmers can produce it.

In brief, several key agricultural trends have emerged in developing countries over the last three decades:

- Food production has grown by roughly 3 percent a year since 1960--a growth rate about double of that in developed countries--raising the level of food production in developing countries by about 120 percent. The performance has, of course, been uneven. Several Asian countries have led the trend, while sub-Saharan African countries have lagged behind.

- When the totals are adjusted for population growth, food production per capita has grown very slowly in developing countries since 1960--rising only by about 0.5 percent a year, a rate roughly equivalent to that in developed countries.

- Food consumption has grown faster than food production, and fastest (in most cases) where income per capita has grown fastest. In general, food consumption has risen considerably more in developing countries than in developed countries since 1970. Nevertheless, undernourishment is rampant, and probably increasing in absolute numbers, in many developing countries--with children and women suffering most.

- Developing countries as a whole have consistently been net importers of food from developed countries--so much so that most of the increase in food consumption per capita over this period has been supplied by imports from developed countries. Imports of grains by developing countries grew by 6.3 percent a year from 1970 to 1986, compared to just 0.3 percent a year by developed countries.

- Despite impressive gains in grain production, developing countries as a whole have become less, not more, self-sufficient in grains over the last two decades (see Summary Figure 1). The decline in self-sufficiency has been greatest in higher-income developing countries; for low-income countries, high rates of self-sufficiency are often a sign of economic stagnation. Some developing countries have achieved strong economic growth along with high rates of self-sufficiency in their staple food crops, but usually this growth has been accompanied by a greater demand for other types of food products, often imported.

- Roughly three-quarters of the growth in food production in developing countries since 1960 has resulted from higher yields rather than from expansion of planted areas. In the 1980s, though, yields have begun to level off. A renewed emphasis needs to be placed on technological advances and changes in farm policy to stimulate food production in developing countries;

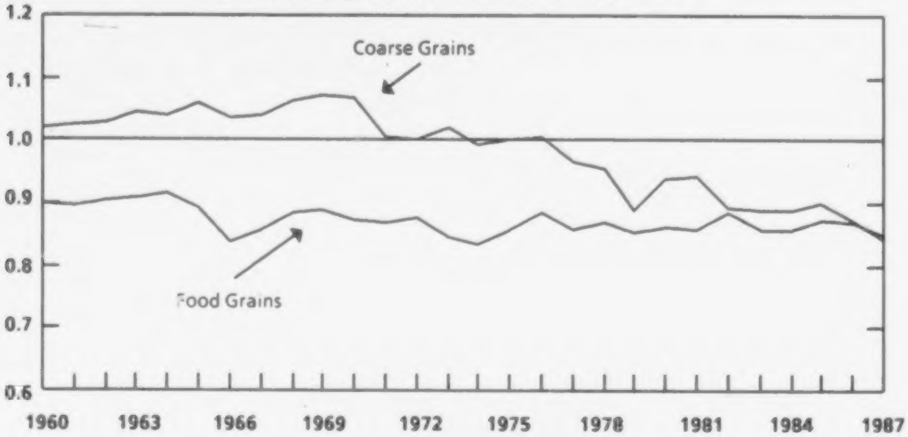
- U.S. agricultural exports to developing countries grew more than fivefold in value between 1970 and 1985. About 42 percent of all U.S. agricultural exports went to those countries in 1985 (see Summary Table 1). Developing countries are now the largest buyers of U.S. grain exports in volume.

AGRICULTURE AND DEVELOPMENT

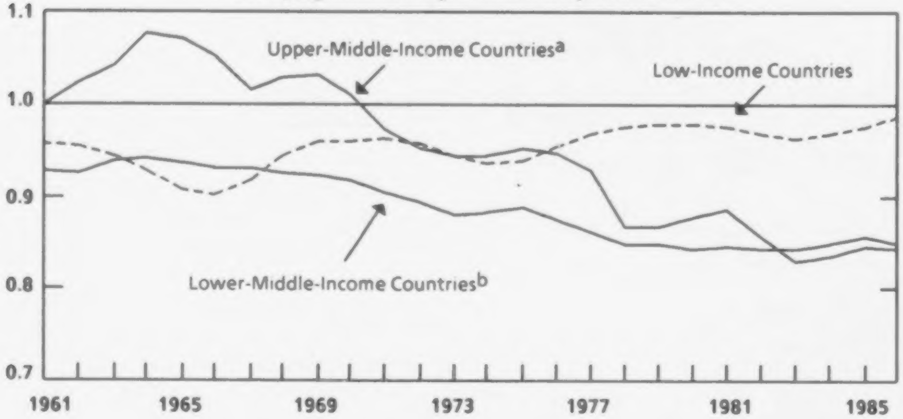
Developing countries increasingly are recognizing, after decades of neglect in many cases, the benefits of a productive and growing agri-

Summary Figure 1.
Self-Sufficiency Ratios for Grains
(1.0 equals self-sufficiency)

All Developing Countries--Food and Coarse Grains



Developing Countries by Income Group--Total Grains



SOURCE: Congressional Budget Office, based on Gary Vocke, "U.S. Grain Imports by Developing Countries," Department of Agriculture, *Issues in Agricultural Policy, Number 542* (May 1988).

NOTE: The self-sufficiency ratio equals domestic grain production divided by the sum of grain production plus net imports. A country with no imports or exports has a self-sufficiency ratio of 1.0.

a. Excluding European countries and high-income oil-exporting countries.

b. Excluding China and other Asian centrally planned economies.

cultural sector. Almost all the poorest developing countries--with the strong backing of most Western (and U.S.) development counsel--now have adopted policy strategies that encourage agricultural and rural development. Even many Sub-Saharan African countries have done so, reversing a long-standing bias in these countries toward the urban and industrial sectors. Agriculture accounts for a large proportion of economic activity in developing countries--almost two-thirds of employment (about 2.3 billion people, roughly half of the world's population) and about one-fifth of total gross domestic product. (These totals include China.) Most of the world's poor and hungry live in rural areas and survive by some form of attachment to agriculture. Increases in income levels for most of the families in developing coun-

SUMMARY TABLE 1. DISTRIBUTION OF U.S. AGRICULTURAL EXPORTS AMONG DEVELOPING, DEVELOPED, AND CENTRALLY PLANNED ECONOMIES

		Percentage of Total Exports to:		
Year	Total (In billions) of dollars)	Developing Economies	Developed Economies	Centrally Planned Economies
		All Agricultural Exports		
1970	7.4	33.0	65.1	1.9
1985	30.2	42.2	49.2	7.8
		Food Grains		
1970	1.4	65.7	33.7	0.7
1985	4.5	72.0	20.4	6.1
		Feed Grains		
1970	0.9	6.8	92.2	0.9
1985	5.4	28.6	38.9	29.9
		Oilseeds and Products		
1970	1.4	19.6	79.1	1.2
1985	4.4	31.5	66.1	1.7

SOURCE: Congressional Budget Office, based on data from Department of Agriculture, Economic Research Service.

tries, including most of the poorest families, must therefore involve improving conditions in agriculture and the rural labor market.

Employment of a large proportion of the labor force in agriculture to produce a relatively small proportion of total output is characteristic of developing countries, reflecting their low levels of labor productivity and correspondingly low per capita incomes. Economic development means shifting the resources employed in agriculture to more productive uses, both in agriculture and elsewhere, especially in the highly productive industrial sector.

The Economic Development Process

The development process is a combination of economic growth and social and political modernization. Economic growth involves expanding a country's supply of usable economic resources (unskilled labor, physical and human capital, and raw materials), improving its technology, and employing all of its productive factors more efficiently. Common barriers to economic growth are insufficient capital, especially human capital, and the inefficient use of available resources. For this reason, it is important for most developing countries to stimulate capital investment and to adopt and carry out government policies promoting economic growth. (Many current policies do little to expand economic opportunities, and are therefore an additional barrier to growth.)

Investments that build a country's physical and human capital stock are costly. They must be financed either by domestic saving or by financial inflows from abroad. Governments may institute policies that encourage domestic saving and increase foreign exchange earnings--for example, by establishing market-oriented financial systems and encouraging the growth of export industries. Effective government policies allow a given level of investment and industrial technology to be channeled to its most productive uses.

The Role of Agriculture in the Development Process

Given the prominent position of agriculture in most of the poorest countries, it necessarily plays a key role in their development. Agriculture in these countries supplies food locally, and in doing so creates economic activity that supports a rural economy employing the bulk of the population. It is from this agricultural base that most economies begin the development process.

A productive agricultural sector serves to reduce many of the barriers to overall economic development. Rising rural incomes generate savings and create demand for goods and services produced in other sectors of the economy. As agriculture becomes more efficient, it frees labor for other, more productive jobs without necessarily reducing the domestic supply of food. Many developing countries rely heavily on agricultural exports to earn foreign exchange. Most countries--including the United States--that have grown successfully over a long period have made major advances in agricultural productivity during their development.

For any particular country, the importance of agriculture in the development process depends on that country's endowment of resources and the level of development it has already achieved. Although successful development usually includes growth in both agricultural and industrial production, countries with poor agricultural resources tend to rely much more heavily on growth in their industrial and service sectors. Countries with the strongest development records have usually employed constructive macroeconomic policies together with price incentives encouraging the most productive use of resources--including agricultural resources. While the farm sector rarely acts as the economywide "engine of growth" throughout the development process, it provides a significant boost at early levels of development. The ineffective use of agricultural resources can seriously retard economic growth, as shown in the case of the Soviet Union. Finally, a natural consequence of economic growth is a declining share of agriculture in overall economic activity.

Government policy decisions in almost all developing (and developed) countries have a strong impact on agricultural conditions, including the demand for food imports. A fundamental trade-off exists between higher prices for agricultural producers and lower food prices for consumers. Policies that subsidize food consumption for the benefit of the urban population often do so at the expense of farmers--reducing rural incomes, discouraging production, and sometimes causing food shortages. More and more countries are handling this "food price dilemma"--the need to maximize gains to predominately poor farmers while minimizing costs to poor consumers--by maintaining farm prices at moderately profitable levels and, when food subsidies are necessary, targeting them at the poorest consumers.

China offers a good example of the important role that government policy plays in agriculture in developing countries. Chinese agricultural production has grown impressively following the decision to liberalize the price system for farmers. China also increased greatly and abruptly its agricultural imports during the early 1980s. Much of the success of other Asian countries in agriculture can be ascribed to government policies favorable to farmers, while much of the failure of Sub-Saharan African farmers can be traced to policies that discriminated against agriculture.

To be effective, agricultural policy must be comprehensive--that is, its scope must include policies for the production, distribution, and consumption of food along with other agricultural policies, since all types of agricultural production compete for many of the same resources. Moreover, agricultural policy must be reinforced by appropriate macroeconomic and trade policies. As many developing countries have painfully learned, even the best-designed farm programs may be unworkable if they are not supported by government commitments on exchange rates, wage levels, interest rates, international trade, and so on.

Most governments in developing countries focus on four basic food policy objectives, with varying degrees of emphasis:

- Efficient growth in the food and agricultural sector;

- Improved distribution of income, primarily by creating productive employment;

- Satisfactory nutritional status for the entire population by providing a minimum subsistence floor; and

- Adequate food security to insure against bad harvests, natural disasters, or uncertain world food supplies and prices.

Agricultural Supply and Demand Relationships in Developing Countries

The central focus of agricultural policy in most developing countries is the food system. A food system supplies food to consumers, in part through a series of markets linking domestic and foreign producers and consumers. These markets influence a multitude of individual decisions by farmers, consumers, and middlemen.

Farm households typically are the main producers and consumers of food in developing countries. Farmers sell surplus supplies, sometimes directly in farmer markets, but more commonly to middlemen (both private and government operators) who eventually supply food to urban areas. Farmers can use revenue from these sales to purchase other types of food and consumer goods, to improve living conditions, to invest in better farming techniques, or to increase their savings. In this way, farm income flows back to nonfarming sectors as demand for manufactured products and services, and as a source of funds for investment or--through taxes--for the government. (People living in rural areas in developing countries generally consume a lower proportion of imported goods than do urban consumers. Raising rural relative to urban consumption, then, slows the growth of demand for foreign exchange.) When food is sold on markets, a layer of infrastructure is required: a marketing chain, transportation facilities, and financial services. As development progresses, more food is marketed, thus expanding the role of nonfarm activities in the food system (and nonfarm income in rural areas). Greater agricultural specialization and reliance on the market generates more agricultural trade, often leading to higher levels of food imports (and agricultural exports).

Even though agricultural conditions vary widely among developing countries, a number of general supply and demand relationships hold in most cases. When the economic returns to farming rise, agricultural production tends to increase. Thus, policies that raise output prices and/or lower input costs stimulate agricultural production. Technological advances have also played a decisive role in expanding agricultural production in many developing countries. In most cases, though, agricultural productivity has responded best when strong incentives for production and new technologies were employed in tandem.

Food consumption grows as the population increases and becomes more urbanized, as food prices fall, and as per capita income increases. Urbanization--often associated with industrial growth (or with poor agricultural policies that lower rural incomes)--also raises the demand for food. As economies grow, demand for higher-quality food grains and animal products tends to increase rapidly, since poor people spend a large proportion of any new income on food. A huge latent demand for food exists in the highly populated developing countries, waiting to be activated by higher income. One way of alleviating hunger among the most needy is food subsidies for the poor.

Developing countries are most likely to expand their food imports when their economies are growing and their agricultural sector is prosperous. Conditions favorable for agricultural production tend to raise agricultural and rural incomes, and to stimulate economic growth in other sectors as well. Since demand for food in developing countries responds vigorously to economic growth, food consumption commonly expands by more than food production, necessitating greater food imports. This relationship between economic development and food imports implies that U.S. efforts to expand farm exports should focus on stimulating economic growth, including that of agriculture, in developing countries.

U.S. INFLUENCE ON AGRICULTURE IN DEVELOPING COUNTRIES

The United States can influence agriculture in developing countries in a number of ways. Most directly, U.S. foreign economic assistance programs can help developing countries expand agricultural production--and food consumption--by improving the productivity of both their land and their farmers. Less directly, but often more importantly, U.S. macroeconomic, trade, and agricultural policies help to determine the environment in which economic growth takes place. Private groups in the United States--foundations, charities, universities and agribusiness--also make substantial contributions. The effectiveness of U.S. actions may be increased or diminished by the actions of other countries, events in international markets, and, most importantly, by conditions in the developing countries themselves.

From the 1950s into the 1970s, many developing countries--lacking their own means--relied heavily on U.S. policy leadership, agricultural research, and financial assistance. More recently, direct U.S. influence through foreign assistance appears to have declined somewhat. Many developing countries outside Sub-Saharan Africa are capable now of developing and implementing much of their own agricultural technology and policy. Their independence from official U.S. influence is enhanced by the assistance they obtain from private (multinational) sources or from other aid donors. In the current setting, agricultural development outside of Sub-Saharan Africa is often more sensitive to U.S. macroeconomic and agricultural policies than to direct U.S. economic assistance.

The history of soybean production in Brazil is an important example of this independence. Soybeans began to be produced in Brazil during the early 1960s, with the transfer of seed varieties developed in the United States for use in the southern states. Although U.S. assistance may have helped in this transfer, it is unlikely that Brazil would have failed to procure these seeds eventually. Since the mid-1960s, Brazilian research and development efforts, largely independent, have succeeded in improving the soybean yields.

The Exposure of Developing Countries to U.S. Influence

Developmental needs differ among countries. Poorer countries clearly need substantial transfers of resources and of advice on development. As economies become more self-sustaining, however, to achieve growth they tend to rely less on government-sponsored, concessionary transfers of resources and more on private international financial sources and the opportunities provided by a growing world economy. Thus, poorer countries look to the United States for direct financial and technical assistance, whereas advanced developing countries are more concerned with U.S. policies that affect world market conditions.

During the 1980s, developing countries have found themselves burdened with heavy foreign debt. Unable to obtain much additional private financing, they have become increasingly dependent on governmental assistance. They need both public and private financial assistance, however, to enable them to carry out necessary reforms and regain their financial health. The U.S. approach to this debt crisis has been primarily to encourage multilateral agencies--most importantly, the International Monetary Fund and the World Bank--to press the governments of these countries to carry out policies of retrenchment in return for temporary financial support until they can again attract private investment. In some cases, however, as with Mexico, the United States has provided direct financial assistance--through the Treasury rather than the usual foreign aid agencies.

The agricultural development needs of developing countries can be summarized as follows:

- Direct assistance to improve conditions in the agricultural sector and in rural communities;
- Appropriate macroeconomic support;
- Favorable world market conditions; and
- Emergency food and financial relief.

U.S. Foreign Economic Assistance

The federal budget classifies foreign aid as either international security assistance or development assistance. Security assistance includes both military and economic aid, and tends to be concentrated on countries considered strategically important. Development aid--consisting both of bilateral programs and of contributions to multilateral development organizations--is targeted more broadly at improving conditions for the world's poor and toward meeting the long-term development needs of a wide range of developing countries. U.S. economic assistance is about equally distributed between security and development aid.

Bilateral aid made up between one-third and one-half of all development aid throughout the 1980s, with contributions to multilateral agencies such as the World Bank and Public Law 480 food aid accounting for the bulk of the rest. From 1976 to 1986, real outlays on development assistance remained roughly constant, while real spending on security assistance almost doubled.

Not only has the relative importance of U.S. development assistance fallen as compared with security assistance, it has also fallen in comparison with that of other countries--from about 58 percent of all official development aid given by industrialized countries in 1965 to 29 percent in 1986. Japan seems about to overtake the United States as the world's largest bilateral donor. Among the consequences of the relative decline in U.S. development assistance are a reduction in this country's power to influence policies in the developing countries, and limitations on the scale and diversity of projects undertaken.

Agricultural development projects have traditionally been a major focus of U.S. bilateral aid: about half of the Agency for International Development's spending has been in the field of agriculture over the last two decades. Almost all U.S. bilateral aid to agriculture is delivered to low-income and lower-middle-income countries (see Summary Table 2). The United States is also the largest provider of food aid to developing countries.

Effectiveness of Agricultural Assistance Projects

Efforts to evaluate agricultural assistance projects, although few in number, strongly support a belief in the efficacy of such aid. On average, the agricultural programs yield a higher economic rate of return than other types of assistance, and tend to create employment, make more food available, and reduce poverty. Agricultural research and water resource development programs have been particularly successful. Programs to develop national food policy strategies and improve government administration in this area receive generally high marks.

The overall achievement of the agricultural development aid programs masks a number of problems. First, their success has been uneven: programs in Asia have typically been quite effective, while those in Sub-Saharan Africa have commonly been much less productive. Failure rates for agricultural projects have been higher on average than for those in other fields, largely because of failures in Africa. Even agricultural research, which generated huge economic returns throughout Asia, has little to show as yet in Africa. Various land management programs, often related to new settlement projects intended to expand acreage, have been consistently disappointing everywhere. A recurring problem for both donors and recipients is that priorities have shifted repeatedly over time, often duplicating mistakes made in previous agricultural aid programs.

What has been the overall contribution of official development assistance to the impressive growth in agricultural production in developing countries? No estimate has been made. It appears unlikely, however, that the countries receiving this assistance could otherwise have achieved such rapid growth in agricultural production over the last 20 years. During this period, aid-funded research helped develop high-yielding seed varieties suitable to farming conditions in developing countries; it also helped provide the financial, technical, and policy support needed to induce farmers to follow high-yield farming practices. Private U.S. agencies, such as the Ford Foundation and the Rockefeller Foundation, also played a prominent role in establishing

SUMMARY TABLE 2. U.S. DEVELOPMENT ASSISTANCE IN AGRICULTURE, RURAL DEVELOPMENT, AND NUTRITION, 1987 (In millions of dollars)

Developing Countries	Total	Africa	Asia and Near East	Latin America
Lower-Income Countries	253.0	89.9	151.0	12.1
Lower-Middle-Income Countries	218.7	23.5	75.9	119.3
Upper-Middle-Income Countries	8.3	0.0	0.0	8.3

SOURCE: Congressional Budget Office from Agency for International Development, budget request for fiscal year 1987.

the research institutes that carried out much of the work of developing improved seed varieties. (The Rockefeller Foundation and the Ford Foundation established between 1959 and 1963 the first two major international research institutes: the International Rice Research Institute in the Philippines and the International Center for Improvement of Maize and Wheat in Mexico. A number of additional institutes for different commodities and regions have since been founded. Multilateral development agencies and developed countries took over much of the funding of these institutes as their financial requirements expanded.)

The payoff for official aid may not be as large in the future as in the recent past. A number of countries are now able to fund their own agricultural research centers and purchase advanced farming technology from private sources (although some are hampered in doing so by the debt crisis). Barring another technological breakthrough, official economic assistance is not likely to generate a new leap forward in agricultural production in developing countries, though such aid may prove quite beneficial for certain farmers and countries, especially those in Sub-Saharan Africa.

AGRICULTURAL DEVELOPMENT AND U.S. AGRICULTURAL EXPORTS: AN OVERVIEW

Some farm groups have expressed a fear that advances in agriculture abroad may create competition for U.S. agricultural exports. They point out that while agricultural production in developing countries was growing so impressively over the last three decades, U.S. agricultural exports were declining from high levels of growth in the late 1970s to a state of depression throughout most of the 1980s, although picking up somewhat in 1987 and 1988. This trend raises the prospect that the countries that were thought to offer the best markets for expanding U.S. exports may instead emerge as major competitors.

In fact, however, developing countries have expanded food imports substantially over the last three decades. Their food imports increased at more than twice the rate of those in developed countries between 1965 and 1985. Developing countries have increased their share of world imports of grains from about one-third in 1970 to almost one-half in 1987.

The downturn in U.S. agricultural exports during the 1980s was caused primarily by a combination of stagnant world demand and the loss of a share of the world market to foreign competitors. A tight U.S. monetary policy contributed significantly to the world recession in 1981 and 1982, subsequently igniting the debt crisis in the developing countries, while U.S. farm policies and the appreciation of the dollar contributed to make U.S. export prices uncompetitive. The most precipitous fall in U.S. agricultural exports was in exports to developed and centrally planned economies, although there was some decline in exports to developing countries. Measured in millions of wheat-equivalent metric tons, U.S. agricultural exports of grains and oilseeds to developed countries fell from 67 to 43, to centrally planned economies from 26 to 7, and to developing countries from 51 to 46, in the period 1980-1986.

The slowdown in world economic activity, together with the debt crisis, were the main reasons for the decline in developing countries' food imports from the United States. Growth of imports lessened chiefly in regions where food production per capita was falling--Latin America, North Africa, the Middle East, and Sub-Saharan Africa (see Summary Table 3). Food imports accelerated in Asia, excluding China, at a time when food production per capita was increasing solidly in that region. The crucial factor was not food production, but per capita income: the Asian economies grew much faster than other developing economies during the 1980s.

Growth in food consumption still has far to go in developing countries, where food comes mainly from vegetable sources and where the average person consumes about 35 percent fewer calories and about 40 percent less protein than in the United States. The huge potential food consumption among these 3 billion people will become actual as their incomes rise. Food consumption expands rapidly in developing countries when per capita incomes rise, in contrast to developed countries where food demand is much less dynamic. For this reason, developing countries, including China, are likely to account for much of the future growth in world food consumption.

SUMMARY TABLE 3. TRENDS IN ECONOMIC GROWTH, FOOD PRODUCTION, AND FOOD IMPORTS IN DEVELOPING COUNTRIES
(Average annual growth rates, in percent)

Region	Gross Domestic Product per Capita, 1980-1985	Food Production per Capita		Food Imports	
		1975-1981	1981-1986	1975-1981	1981-1986
All Developing Countries	-0.5	0.6	0.3	9.4	0.9
Latin America	-1.9	1.0	-0.5	11.9	-4.5
Asia[a]	3.1	1.1	1.0	2.3	3.0
Middle East	-3.4	0.4	-0.1	14.4	2.5
Africa	-2.2	-1.8	-0.1	10.4	1.6

SOURCE: Congressional Budget Office, based on data from the Food and Agriculture Organization and the World Bank.

a. Excluding China and Japan. See Table 5 in Chapter I for regional definitions.

The increasing importance of developing countries as major food consumers implies that the United States could best expand its agricultural exports by stimulating economic growth in those countries. Direct assistance to agriculture in the poorest developing countries is a starting point toward raising real incomes and food consumption, eventually stimulating food imports. In the more advanced countries, which account for a large proportion of food imports by developing countries, food demand is more sensitive to overall economic growth than to agricultural activity in particular. In most cases, U.S. policies that encourage higher agricultural productivity and economic growth in developing countries serve not only broad geopolitical and humanitarian goals, but also help to open markets for a wide range of U.S. exports, especially agricultural exports. Other U.S. policies, including macroeconomic policy, that are favorable to growth in developing countries are likely to contribute significantly to expanding markets for U.S. agricultural products in developing countries.

CHAPTER I

ECONOMIC GROWTH AND AGRICULTURAL TRENDS IN DEVELOPING COUNTRIES IN RELATION TO U.S. AGRICULTURAL EXPORTS

Agricultural production has expanded rapidly over the last three decades in many developing countries. At the same time, those countries have substantially increased their imports of agricultural products, resulting in a striking surge in their purchases of U.S. agricultural exports during the 1970s. These general trends do not hold for all developing countries, however, or for every commodity. The experience varies considerably, depending especially on a country's level of development. This chapter summarizes economic and agricultural development trends throughout the world, but with an emphasis on developing countries. It views the agricultural attributes of these countries in the perspective of world markets, with particular regard to U.S. agricultural export markets, and attempts to describe how these relationships have changed over time.

DIVERSITY AMONG DEVELOPING COUNTRIES

Developing economies are distinguished from developed economies in terms of real per capita income, and also by the development of their economic infrastructure (roads, communications, industrial labor force, and so forth). The World Bank places economies with less than $4,000 real income per capita in 1985 in the developing category.[1] The developing-country category includes countries with a large range of per capita income levels. Some of the countries have relatively advanced economies, enabling a large proportion of their populations to live and work at developed-country standards. Others, such as Bangladesh and Ethiopia, are truly poor countries where per capita incomes are estimated at less than $200 a year.

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[1] See the World Bank's *World Development Report 1987* (New York: Oxford University Press, 1987). Several countries with higher real per capita incomes are also defined by the World Bank as developing countries, presumably because of their relatively weak economic infrastructure. These include the high-income oil producing countries, the city-states of Hong Kong and Singapore, and Israel.

Developing countries vary from land-rich to land-poor, underpopulated to overpopulated, resource-rich to resource-poor, and income-poor to relatively well-off. Some of them (such as Argentina and Thailand) began to advance as early as the 19th century, while others (such as Bangladesh and Ethiopia) have yet to achieve any real per capita income growth. A number of the more advanced developing countries have forged modern and highly productive industrial sectors that are fully competitive in international markets. At the same time, many others rely almost exclusively on low-yielding agriculture and on exports of primary commodities. Some developing countries have been strongly affected by the international debt crisis.

The developing countries can be placed in three groups: those with *low-income economies*, often called the "fourth world" because of the serious poverty their populations endure; those with *lower-middle-income economies*, where the infrastructure has been modernized to an important degree, providing a basis for sustained economic growth; and those with *upper-middle-income economies*. Some of the latter are called newly industrialized countries (NICs) because of their success in increasing manufacturing output.[2] Some general characteristics of these three groups of developing countries are presented below, and summarized in Table 1.

Characteristics of Low-Income Developing Economies

About half of the world's population lives in countries where annual income per capita is roughly equal to or less than weekly income per capita in the United States. Low-income economies predominate in Sub-Saharan Africa and Asia. Except for India and especially China, little headway has been made in alleviating poverty in these low-income economies.[3] Almost all growth in real income in these countries over the last 20 years has been absorbed by population increases. Indeed, the economic situation has worsened for many during the 1980s in the aftermath of the commodity market depression of the

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2. A fourth group of high-income oil exporters--Libya, Saudi Arabia, Kuwait, and the United Arab Emirates--is not included in this categorization for the sake of brevity.

3. Trends in Pakistan and the other major countries of the Indian subcontinent have been similar to those reported for India.

early 1980s and the subsequent debt crisis. Trends in real investment--the most basic requirement for future growth--mirror those in real income, except that the downturn in real investment during the 1980s was even steeper. Between 1980 and 1985, real investment fell about 10 percent among low-income economies other than India and China. These trends have been even more pronounced in Sub-Saharan Africa, which suffered a decline of almost 20 percent in per capita income, and almost 50 percent in real investment, between 1980 and 1985.

China and India, on the other hand, are success stories. Not only have they maintained positive growth in income and investment over the last 20 years, they have raised their growth rates during the 1980s, a period when most developing countries have floundered. China, remarkably, achieved one of the fastest growth rates in the world from 1980 to 1985, well exceeding the widely acclaimed growth rates in Korea. Much of the success in China and India can be attributed to reductions in government controls and more reliance on market forces. One way to keep this success in perspective, though, is to bear in mind that estimated per capita income in both India and China still hovers around just $300.[4]

Low-income countries are also distinguished by their heavy reliance on agriculture. Almost three-fourths of the labor force in low-income economies is employed in agriculture. Agricultural output accounts for a substantial proportion of total gross domestic product (GDP), averaging about one-third for the group as a whole but reaching one-half in Bangladesh.[5] Growth in the agricultural sector has been mixed, with Asian countries generally doing reasonably well and African countries much less so. Agricultural growth in Sub-Saharan Africa has increased marginally during the 1980s, but several countries, including Ethiopia, have experienced large declines.

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[4] Income values for China may be understated somewhat because of the difficulty of accurately valuing output in a command economy where official prices often do not reflect true scarcity values. National income levels in all developing countries may be understated somewhat because of the difficulty of valuing barter transactions and home consumption. The latter is particularly important for the agricultural sector in poorer countries.

[5] These proportions would be much higher for most developing countries if all businesses that depend on agriculture were included.

TABLE 1. COMPARISONS OF DEVELOPING COUNTRIES

Groups of Countries	Population (In millions for 1985)	GDP per Capita (1985 U.S. dollars)	Average Annual Growth in GDP per Capita (In percent)		Average Annual Growth in Real Investment (In percent)	
			1965-1980	1980-1985	1965-1980	1980-1985
All Developing Countries	3,682	610	3.7	1.3	8.2	0.8
Highly indebted countries	555	1,410	3.9	-2.3	8.2	-9.4
Sub-Saharan Africa	418	400	2.6	-4.0	9.0	-11.4
All low-income countries	2,439	270	2.5	5.4	7.2	11.4
Low-income countries less China and India	634	200	0.5	0.1	3.2	-2.1
Ethiopia	42	110	0.1	-2.2	-0.6	1.6
Bangladesh	101	150	0.3	1.0	0.0	0.5
Zaire	31	170	-1.4	-2.0	6.7	-4.4
India	765	270	1.5	3.0	4.8	4.6
China	1,040	310	4.2	8.6	10.5	16.5
All lower-middle-income countries	675	820	3.8	-0.9	9.1	-3.5
Indonesia	162	530	5.6	1.4	16.1	5.6
Philippines	55	580	3.1	-3.0	8.5	-14.4
Egypt	49	610	4.3	2.4	11.5	0.7
Nigeria	100	800	5.4	-6.7	14.7	-18.0
Peru	19	1,010	1.2	-3.9	0.2	-16.5
All upper-middle-income countries	567	1,850	4.4	-0.3	6.8	1.2
Brazil	136	1,640	6.5	-1.0	10.2	-5.5
Mexico	79	2,080	3.3	-1.8	8.5	-9.1
Argentina	31	2,130	1.7	-3.0	4.4	-13.8
Korea	41	2,150	7.6	6.4	16.5	9.6
All Developed Countries	737	11,810	2.8	1.7	2.9	2.7
United States	239	16,690	1.9	1.5	1.8	5.2

SOURCE: The World Bank, *World Development Report 1987*, statistical appendix tables.

(Continued)

In most low-income countries, growth in agriculture has been an important determinant of overall growth.[6] This is especially so for

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[6] The contribution of agriculture to overall growth in an economy can be derived from Table 1 by multiplying the average annual growth rate in agriculture by the percentage of agriculture in total gross domestic product.

TABLE 1. Continued

Average Annual Growth in Agriculture (In percent)		Percent of Agriculture in Total GDP (1985)	Percent of Labor Force Employed in Agriculture (1980)	Fertilizer Consumption (Hundreds of grams of plant nutrient per hectare of arable land)		Daily Calorie Supply per Capita	
1965-1980	1980-1985			1970	1984	1965	1985
3.1	4.0	20	62	232	608	2,150	2,470
3.2	1.9	15	40	165	296	2,424	2,613
1.9	0.9	34	75	32	70	2,094	2,024
2.7	6.0	32	72	177	657	2,046	2,339
2.0	1.9	36	71	78	197	1,997	2,073
1.2	-3.4	44	80	4	35	1,832	1,681
1.5	2.8	50	75	142	611	1,964	1,899
n.a.	2.5	31	72	8	14	2,188	2,154
2.8	2.7	31	70	114	394	2,100	2,189
3.0	9.4	33	74	418	1,806	2,034	2,602
3.3	1.9	22	55	149	395	2,115	2,514
4.3	3.1	24	57	119	746	1,792	2,533
4.6	1.7	27	52	214	319	1,936	2,341
2.8	1.9	20	46	1,282	3,639	2,435	3,263
1.7	1.0	36	68	3	87	2,185	2,038
1.0	1.9	11	40	297	224	2,324	2,171
3.7	2.3	10	29	402	684	2,622	2,987
4.7	3.0	13	31	169	304	2,405	2,633
3.2	2.3	11	37	246	602	2,643	3,177
1.4	2.8	n.a.	13	24	37	3,209	3,221
3.0	6.3	14	36	2,466	3,311	2,255	2,841
1.2	1.5	3	7	986	1,228	3,114	3,417
1.3	1.8	2	4	800	1,041	3,292	3,663

NOTE: n.a. = not available.

China, where the 9.4 percent growth in agriculture contributed almost one-third of China's impressive overall GDP growth rate. For all low-income economies other than China and India, growth in the agricultural sector boosted average annual growth in GDP per capita from -0.5 percent to 0.1 percent between 1980 and 1985. Agriculture is not always a positive factor, however. In the case of Ethiopia, an average annual decline in real agricultural output of 3.4 percent in the 1980-1985 period dragged down overall economic growth.

Low-income economies typically have low levels of fertilizer use and daily food consumption per capita, both general indicators of the health of agriculture. Between 1970 and 1984, fertilizer use per hectare of arable land increased dramatically in most low-income Asian countries, especially in China and Bangladesh, reflecting the results of the "green revolution." Application rates still vary considerably among low-income countries--with rates far below optimal levels in a number of countries, especially in Sub-Saharan Africa. Daily calorie supply per capita, a proxy for food consumption, is much lower for low-income countries than for others.[7] In 1985, the average person in low-income economies other than China and India consumed about 40 percent fewer calories than did the average person in a developed economy--2,339 versus 3,417 calories. Although China has made large strides in increasing food consumption per capita over the last 20 years, India has barely been able to increase its per capita consumption, and many other low-income countries have seen population growth outstrip consumption. Daily calories per capita for Sub-Saharan Africa fell by about 3 percent between 1965 and 1985, while Ethiopia suffered a 10 percent decline from an already insufficient level.

Characteristics of Lower-Middle-Income Developing Economies

A number of the lower-middle-income countries achieved impressive advances in development during the 1960s and 1970s, raising their real per capita incomes as a group by about 75 percent between 1965 and 1980. Indonesia, for example, more than doubled its per capita income over this period, a growth rate just slightly below Korea's. A firm foundation for continued advancement appeared to have been established in many of these countries, as their domestic infrastructure and industry became increasingly modern and productive. For a number of these countries, however, development has come to an abrupt halt during the 1980s, as the repercussions of the 1982 world recession, the subsequent debt crisis, and the fall in commodity prices spread throughout the developing world. Real income per capita and real investment fell by about 4 percent and 16 percent, respectively, for this group of countries from 1980 to 1985.

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[7] Daily calorie supply per capita, as defined in the World Bank's *World Development Report 1987*, equals the calorie equivalent of food supplies from domestic production plus imports, less exports, adjusted for changes in stocks from one year to the next, and then divided by the population.

A clear sign of the higher development level of this group of countries compared with the low-income countries is the smaller role of agriculture in their overall economic activity, together with a higher daily supply of calories per capita. Nevertheless, more than half of their labor force still works in agriculture, which accounts for about one-fifth of total GDP. During the 1960s and 1970s, industrialization and agricultural growth proceeded in tandem for most of these countries. Agriculture contributed about one-eighth of the total growth in GDP for all lower-middle-income countries in the 1965-1980 period. The proportion rose to one-quarter of total growth in 1980-1985, as agriculture proved more resilient than other sectors during the general economic downturn of that period.

The fact that daily calorie supply per capita is larger for this group than for the low-income countries shows that a decline in the proportion of resources allocated to agriculture in no way implies lower consumption of agricultural products. A number of countries in this income group raised their calorie supply significantly between 1965 and 1985: Indonesia by about 41 percent, the Philippines by about 21 percent, and Egypt by 34 percent. Egypt, in fact, attained levels almost equivalent to those of developed countries.[8] Peru and Nigeria, on the other hand, suffered declines in calorie supply over this period.

Characteristics of Upper-Middle-Income Developing Economies

Upper-middle-income developing economies are characterized by relatively modern production facilities, with a significant segment of their population living at close to the standards of developed countries. Many of the countries in this group have been labeled newly industrialized countries (NICs) because of their success in increasing manufacturing output.[9] Prominent NICs--such as Korea, Taiwan, Hong Kong, Singapore, and Brazil--have grown spectacularly over the last 20 years, doubling to tripling their real per capita income. Even after such growth, however, their average income per capita is still only about 16 percent of that in developed countries.[10] Average growth rates dropped off considerably for several of the NICs during the early 1980s. Among highly indebted countries, many of which are in Latin America, real per capita income fell by about 11 percent from 1980 to 1985. Real investment fell by about 40 percent in those countries, representing a serious loss of momentum. Only the Asian NICs have been able to sustain healthy income and investment growth through the 1980s.

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[8] Egypt's success in increasing calorie supply is related directly to high levels of food aid, since growth in Egypt's agricultural sector has been somewhat below the average rate for developing countries over the last 20 years. In 1984, Egypt received almost 2 million tons of imported cereal aid, much of which was supplied by the United States.

Agriculture still plays a surprisingly large role in these advanced developing countries. It supplies almost one-third of all employment, and generates about one-tenth of total output. The large proportion of the labor force still employed in agriculture shows that these countries still have considerable capacity to shift labor into other sectors such as industry, and that continued high growth is possible before labor shortages begin to occur. In most cases, buoyant economic growth in these countries has been reinforced by growth in agricultural output. Daily calorie supply per capita increased between 1965 and 1985, although it still remains about 13 percent lower than in developed countries.

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[9] Several countries in this group have not experienced such success, but rather have lived off past accomplishments. For example, Argentina, with a per capita income currently the same as Korea, has achieved almost no real income growth per capita over the last 60 years.

[10] The difference illustrates why many of their governments object to being assigned developed-country status in international economic relations. Singapore, with a per capita income of $7,420 in 1985, and Hong Kong with a per capita income of $6,230, rank with developed countries such as Spain and Italy, which had per capita incomes of $4,290 and $6,520, respectively. On the other hand, per capita incomes in Korea and Brazil, at $2,150 and $1,640, respectively, were well below developed-country standards.

Key Differences and Similarities Among Developing Countries

Economic, political, and social conditions differ widely among the developing countries.[11] These differences are even more pronounced now than in the past, as the successful developers increasingly pull away from the truly poor countries of the world. It is important to recognize this diversity: not only do levels of need vary considerably, but so may economic problems and appropriate policy responses to them.[12]

The relative size of the agricultural sector grows progressively smaller as real income per capita increases. In the low-income economies in 1985, almost one-third of the total GDP came directly from agriculture. The proportion was about 20 percent for middle-income developing countries, 10 percent for upper-middle-income developing countries, and 3 percent for developed countries as a whole (2 percent for the United States). A similar trend holds for employment: the proportion of the labor force employed in the agricultural sector decreases steadily from 72 percent in low-income economies to 29 percent in upper-middle-income economies to just 7 percent in developed countries (4 percent in the United States). Even while the proportion of resources dedicated to agriculture drops, though, food consumption per capita--and often food imports--rise steadily as per capita incomes increase.[13]

The technology of agricultural production in developing countries has changed considerably over the last two decades. Traditional farming techniques have been augmented by the more intensive use of inputs such as fertilizer, pesticides, and water from irrigation in conjunction with high-yielding seeds. Average fertilizer use has increased almost threefold from 1970 to 1984 for all developing countries. China, India, and Bangladesh, each of which generated impressive agricultural results during the 1970s and 1980s, increased their fertilizer use about fourfold over this period, while Sub-Saharan African countries doubled their fertilizer use. In the latter countries, however, fertilizer use is still only one-tenth that of average developing countries.[14]

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[11] Numerous political, religious, and social factors--operating within a legacy of colonialism--impinge on the developing economies. These influences are manifest not only in government policies but also in the responses of the population to economic stimuli. In many cases, political programs are a direct reflection of cultural and religious traditions, as are consumer preferences and producer attributes.

[12] Differences in agricultural characteristics are examined in detail later in Chapter I and in Chapter II.

[13] At some point, a satiation level is reached and spending shifts among food categories.

Although the economies of developing countries vary considerably, a number of similarities also exist. Numerous studies have documented the key role of economic policy in all stages of growth.[15] In countries with widely varying economic systems--ranging from China to Brazil--consumers and producers have been found to respond vigorously to price incentives that allow people to improve their standards of living. Countries that have been able to take advantage of world market opportunities have outperformed others.[16] Although few developing countries subject their economies to the vicissitudes of fully free markets, respect for domestic and international market signals is increasingly associated with economic advancement, while economic policies that turn away from the market have proved much less successful.

Development in all but a few of the most resilient countries has been impeded severely by the world recession of the early 1980s, the subsequent depression in world commodity prices, and the ongoing debt crisis. Even as growth in developed countries rebounded, the depression has lingered for many developing countries, especially the poorest. Living standards that were already marginal for millions of people in developing countries have eroded even further during the 1980s. These experiences underline the vital importance of international trade and capital flows to successful development. Since the debt crisis began in 1982, many developing countries have experienced a net outflow of financial capital, representing a serious drain on the already limited resources of these countries.

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[14] The optimal level of fertilizer application varies considerably, depending on such factors as the types and frequency of crops, and on climate and soil conditions. In Argentina, for example, high wheat and corn yields are obtained with low rates of fertilizer application because of favorable natural conditions. In South Asia, on the other hand, intensive wheat and rice cropping requires high fertilizer application to induce good yields. In some developing countries, and in most developed countries, higher fertilizer application cannot significantly increase output levels given current technologies, implying that these countries have reached roughly optimal fertilizer use. A number of developing countries, however, and particularly Sub-Saharan African countries, have considerable potential for raising their yields through greater use of fertilizer.

[15] See World Bank, *World Development Report 1987* (New York: Oxford University Press, 1987); and the 10-volume National Bureau of Economic Research study on foreign trade regimes and economic development, the results of which are synthesized in Jagdish Bhagwati, *Anatomy and Consequences of Exchange Control Regimes* (Cambridge: Ballinger Publishing Company, 1978), and Anne Krueger, *Liberalization Attempts and Consequences* (Cambridge: Ballinger Publishing Company, 1978).

[16] An outward-looking development strategy forces a country to produce goods that are competitive on world markets, which for most developing countries means exporting agricultural, mining, and/or labor-intensive industrial products.

TRENDS IN FOOD PRODUCTION, CONSUMPTION, AND TRADE

Two large swings have occurred in world food supply and demand over the last 15 years. During the 1970s, the demand for food grew faster than the food supply, even though food production increased substantially around the world. Food prices escalated and stockpiles dwindled, raising fears of worldwide shortfalls. This upswing in demand was initiated by the emergence of the Soviet Union as a major importer of grains during the early 1970s. Food consumption also increased rapidly in many developing countries in response to strong economic growth and favorable international financial terms--partly related to the need to recycle petrodollars. World food imports about doubled from 1965 to 1980, led by large increases in centrally planned economies, developing countries, and Japan.[17]

The severe world recession in 1981 through 1983, and the subsequent debt crisis for many developing and centrally planned economies, dramatically reduced growth in food demand in the 1980s. At the same time, world food production rose somewhat in response to higher prices and generally good weather. The early 1980s, as a result, were a period of agricultural surplus, with mounting carryover stocks leading to increasingly weak prices. Recently, world demand has once again begun to grow faster than world supply. The faster growth in demand is a reflection of low prices coupled with economic growth, while the lag in supply reflects low prices and poor weather in Asia and the United States. U.S. agricultural exports have accommodated these swings, shifting from an export boom in the 1970s to an export slump throughout most of the 1980s, and recently returning to export growth. During this period the United States has been a residual supplier to world agricultural markets.

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[17] Food and Agriculture Organization of the United Nations, *FAO Trade Yearbook*, various issues.

How did agricultural activity in developing countries interact with these broad shifts in world supply and demand conditions? Food consumption grew substantially in developing countries, outstripping growth in food production, although the latter grew impressively. In fact, food imports from developed countries supplied most of the increase in food consumption in developing countries. During the 1980s, the growth in food consumption, food imports, and food production in many developing countries subsided somewhat, especially in Sub-Saharan Africa, paralleling the general economic downturn in most developing countries. Even with the generally strong growth in per capita consumption in developing countries over the last several decades, hundreds of millions of people remain undernourished, and famines still cause widespread death.

Food Production

Food production in developing countries has increased by about 3 percent a year over the last three decades--more than doubling in volume, and growing about twice as fast as in developed countries (see Table 2). This success has not been evenly distributed. China has increased food production spectacularly since the mid-1960s--almost tripling total grain production despite a reduction in the area harvested.[18] Food production increased strongly in most of Asia, particularly in the early 1980s, as the full effects of the "green revolution" and its associated policy reforms were felt. Latin America, on the other hand, after achieving vigorous growth in food production in the 1960s and 1970s, entered a period of declining growth as the debt crisis forced a major retrenchment in agricultural investment. Food production in North Africa and the Middle East continued at a good pace throughout the period.

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[18] China's success in increasing grain productivity over the last two decades can be attributed to several things: increased inputs, such as chemical fertilizer, and a series of pro-market reforms begun in the late 1970s. See Dwight Perkins, "Reforming China's Economic System," *Journal of Economic Literature*, vol. 26 (June 1988), pp. 601-645.

Growth in food production has been weakest in Sub-Saharan Africa, partly because of poor weather conditions but largely as a result of government policies that have discouraged local food production. In contrast to all other developing countries, the average yield for all grain production in Sub-Saharan Africa has not changed significantly in the last 25 years. Instead, most of these countries' increase in food production has been generated by increasing the area

TABLE 2. WORLD FOOD PRODUCTION TRENDS
(Average annual growth rates in percent)

Region	Food Production per Capita 1960-1970	Food Production per Capita 1970-1980	Food Production per Capita 1980-1985	Food Production per Capita 1985-1987	Total Food Production 1960-1970	Total Food Production 1970-1980	Total Food Production 1980-1985	Total Food Production 1985-1987
Developing[a]	0.7	0.4	0.6	-2.5	3.1	2.8	3.2	0.0
Latin America	1.8	1.1	-0.4	-0.5	4.1	3.7	1.9	1.6
East Asia[b]	1.8	0.6	2.2	0.5	4.4	2.4	3.9	1.8
Southeast Asia	0.2	1.7	2.0	-2.6	2.7	4.2	4.3	-0.4
South Asia	0.5	-0.5	1.6	-6.0	2.8	1.8	3.8	-3.7
Middle East	0.5	0.2	0.0	1.0	3.4	3.3	3.1	3.9
North Africa	-0.5	-0.2	-0.2	-1.0	1.9	2.9	2.8	1.6
Sub-Saharan Africa	-0.1	-0.9	-0.2	-4.2	2.3	2.0	2.7	-1.2
Centrally Planned	1.5	0.2	2.6	-0.9	3.4	1.7	3.5	0.4
China	3.3	2.1	6.9	-4.5	5.7	4.1	8.1	-3.2
USSR	2.2	-0.2	0.4	1.6	3.4	0.7	1.5	2.9
Eastern Europe	1.1	1.0	1.4	0.5	1.9	1.7	1.8	0.9
Developed	0.3	0.9	1.0	-2.3	1.6	1.7	1.7	-1.3
United States	0.4	1.2	1.6	-4.3	1.6	2.3	2.6	-3.9
Western Europe	1.0	1.6	0.5	-0.4	1.8	2.0	0.9	-0.4
Japan	-1.0	-2.1	1.8	-2.6	0.0	-0.9	2.3	-2.0
World	0.5	0.2	1.0	-1.9	2.6	2.0	2.9	-0.8

SOURCE: Congressional Budget Office, based on data from U.S. Department of Agriculture, Economic Research Service.

NOTE: Food includes animal and vegetable products, and such nontraded commodities as cassava.

a. Excludes China.

b. Excludes China and Japan.

harvested--from land that is rapidly becoming scarce. The technological revolution that has spurred food production in other countries has yet to reach Sub-Saharan Africa. The poor agricultural performance in this region is even more pronounced when examined in per capita terms.[19]

Food Production per Capita. Food production per capita in developing countries, in general, has fared less well than indicated by trends in food output. Food production a capita grew at a rate of about 0.5 percent per year from 1960 to 1987 compared with 3 percent a year for gross food production (see Table 2). Because of faster population growth in developing countries, food production per capita grew at about the same rate as in developed countries. Significant per capita increases were in East Asian countries during the 1960s and early 1980s, in Southeast Asian countries between 1970 and 1985, in South Asian countries between 1980 and 1985, and in Latin American countries during the 1960s and 1970s. Declining food production per capita was the rule in North African and Sub-Saharan African countries throughout the 27-year period--with a fall of about 10 percent in Sub-Saharan Africa. In South Asia, food production per capita remained stagnant throughout the 1960s and 1970s, but grew significantly from 1980 to 1985.[20] China surpassed all other countries by more than doubling per capita food production between 1960 and 1985.

Production Trends for Major Crops. On a crop-by-crop basis, trends have shown considerable diversity. Developing countries, excluding China, have been much more successful at increasing production of food grains than of feed grains. Between 1970 and 1985, developing countries increased wheat production by about 4 percent a year; rice production by about 2.9 percent a year; and coarse grains by only about 1.6 percent a year.[21] China's wheat production expanded at the remarkable pace of 7.5 percent per year from 1970 to 1985, while its rice and coarse grain production increased 2.9 percent and 2.3 percent a year, respectively. India, another large grain producer, nearly matched China's success in wheat and rice. In the production of all grains taken together, however, the developing countries lagged behind the developed countries between 1970 and 1986. Total grain production in the former grew at an average of 2.5 percent a year compared with 3.1 percent a year in developed countries (see Table 3).

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[19] For a good review of the problem of advancing agriculture in Sub-Saharan Africa, see John Mellor, Christopher Delgado, and Malcolm Blackie, eds., *Accelerating Food Production in Sub-Saharan Africa* (Baltimore: The Johns Hopkins University Press, 1987). Since 1985, agricultural conditions have improved somewhat for many Sub-Saharan African countries, in response both to better weather and to widespread policy reforms favoring agriculture.

[20] The Asian drought in 1986 and 1987 hit South Asia most severely, reducing food output per capita by over 10 percent for those two years. In the past, such a food shortfall would have reduced food consumption below subsistence levels for many of the poor, leading to starvation and calls for emergency food relief aid, as has occurred recently in some African countries. Because of the recent success of food production in South Asia, however, stockpiles of food--particularly grains--from bumper crops during the early 1980s allowed most South Asian countries to survive without large food imports or debilitating reductions in food consumption.

Several developing countries--Brazil, Argentina, and Paraguay--have increased soybean production (and exports) rapidly over the last two decades. As a result, total soybean output by developing countries grew from about 2 million metric tons (mmt) in 1970 to about 26 mmt in 1985. Well over half of this output is exported, either as soybeans or as soybean meal and oil, mostly to developed countries, in particular the European Community.[22] Brazil, Argentina, and Paraguay, plus China, where soybean production originated, produced about 36 mmt in 1985 compared with 51 mmt for the United States, the world's largest producer of soybeans. Developing countries are net exporters of soybean products, mainly because few of them use soybean meal for animal feeds. Most soybeans produced in developing countries, other than in South America, are consumed directly as food. Most of the increase in soybean production in developing countries has resulted from an increase in the planted area rather than, as in grains, from improvements in yields.[23]

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[21] These data on grains and soybean production are from the Foreign Agricultural Service databank in the U.S. Department of Agriculture.

[22] See International Trade Commission, *U.S. Global Competitiveness: Oilseeds and Oilseed Products*, USITC Publication 2045 (December 1987).

[23] Soybeans traditionally have been produced in temperate climates with the appropriate number of daylight hours. Considerable advances have occurred recently in adapting soybean production to semitropical areas, illustrated by the advance northward of soybean production in Brazil. Currently, soybeans are not well suited to tropical countries, or for areas too far from the equator, such as most of Europe, Canada, and the Soviet Union. See Gary Vocke, "Research and Development Affects U.S. and Third World Soybean Trade," Department of Agriculture, *World Agriculture Situation and Outlook Report-51* (March 1988).

TABLE 3. PRODUCTION, CONSUMPTION, AND TRADE OF ALL GRAINS (In millions of metric tons, average annual growth rates in percent)

			Utilization							
	Production		Total		Feed Use		Imports		Exports	
Region or Country	1986 (mmt)	1970-1986 Growth	1986 (mmt)	1970-1986 Growth	1986 (mmt)	1970-1986 Growth	1986 (mmt)	1970-1986 Growth	1986 (mmt)	1970-1986 Growth
Developing (Less China)	473	2.5	538	3.0	103	7.8	96	6.3	25	0.8
Developed	578	3.1	441	1.2	291	1.0	62	0.3	176	4.6
Centrally Planned (With China)	630	2.6	668	2.8	253	3.5	48	6.1	10	-0.7
World	1,681	2.7	1,647	2.4	647	2.7	206	3.8	212	3.7
Selected Groups of Countries										
Developing										
India	134	2.3	132	2.1	2	7.0	n.a.	n.a.	1	22.6
Bangladesh	17	2.4	19	3.0	n.a.	n.a.	2	10.7	n.a.	n.a.
Indonesia	32	4.3	33	4.4	2	14.7	2	1.2	n.a.	n.a.
Thailand	17	2.8	10	1.7	2	18.4	n.a.	n.a.	7	5.2
Korea/Taiwan	8	0.2	23	3.8	10	13.7	14	7.9	n.a.	n.a.
North Africa/ Middle East	60	3.1	99	4.6	34	11.3	44	9.2	1	3.8
Sub-Saharan Africa	46	2.1	53	2.6	2	8.0	8	6.3	1	1.2
Brazil	40	4.5	42	4.3	23	5.7	3	4.2	n.a.	n.a.
Argentina	22	0.4	13	1.5	7	2.8	n.a.	n.a.	9	-0.5
Mexico	20	2.2	24	4.0	7	7.3	5	21.9	n.a.	n.a.
Developed										
United States	314	3.3	217	1.8	157	1.1	1	7.6	76	4.1
European Community (EC-12)	155	2.5	138	0.4	81	0.3	31	-1.7	49	7.8
Japan	12	-0.4	37	1.8	18	4.2	27	3.7	n.a.	n.a.
Centrally Planned										
China	299	3.8	316	4.4	55	9.7	11	7.1	5	8.8
USSR	200	0.8	220	1.3	125	2.3	27	22.3	1	-15.2

SOURCE: Congressional Budget Office, based on data from Department of Agriculture, Economic Research Service.

NOTE: Annual values are aggregates of each country's marketing year. n.a. = not available.

Yield Trends for Major Crops. The impressive growth in agricultural production worldwide over the last three decades has been spurred by rapid increases in yields, or output per hectare of land. About two-thirds of the growth in cereal production in developing countries has resulted from higher yields, as has nine-tenths of the growth in developed countries (see Table 4). Only Sub-Saharan Africa, which has increased its production mainly by planting more land, has lagged behind. Yields in soybean production have been less buoyant than in grains. Output of individual commodities can increase without gains in yields when the production of one crop is substituted for others, as has been the case for soybeans in Argentina and Brazil. As land becomes increasingly scarce throughout most of the world, however, growth in overall agricultural production will have to rely almost completely on advances in yields.

Food Consumption

The consumption of food in developing countries rose more quickly than its production during the 1960s and 1970s, accommodated by large increases in imports from developed countries (see Table 5).[24] Growth in food consumption leveled off during the 1980s in the wake of poor economic growth and the debt crisis. Food consumption is driven by a combination of population growth and income growth. Rapid population growth in developing countries has expanded the food requirement needed to maintain adequate diets, but this latent demand cannot be realized unless people have enough income to buy food. Renewed economic growth will likely spur a large increase in food consumption, a major part of which will have to be supplied by developed countries.

Calories Supplied per Capita. Food consumption, measured in terms of calories supplied per capita, grew by about 9 percent for all

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[24] One student of the trends reports that food consumption--defined as major food crops--in developing countries, excluding China, increased by an average rate of 3.0 percent a year between 1966 and 1980 compared with a growth rate in production of 2.6 percent annually from 1960 to 1980. Including China, consumption grew by 3.3 percent while production increased by 3.1 percent a year. See Leonardo A. Paulino, *Food in the Third World: Past Trends and Projections to 2000*, International Food Policy Research Institute, Research Report 52 (June 1986).

TABLE 4. PRODUCTION AND YIELD TRENDS (In thousands of metric tons, average annual growth rates in percents)

	Production (Thousands of metric tons)		Yields (Metric tons per hectare)		
Region or Country	1985	Average Annual Growth (1960-1985)	1985	Average Annual Growth (1960-1985)	Percentage of Production Growth from Higher Yields
		Total Grains			
World	1,660,631	2.8	2.32	2.3	84
Developed	609,505	2.6	3.91	2.4	92
United States	345,228	2.6	4.75	2.7	103
European Community (EC-12)	161,221	2.9	4.50	3.0	107
Canada	48,179	2.4	2.22	1.6	65
Australia	24,551	3.3	1.44	0.4	12
Developing	464,819	2.9	1.43	1.8	64
South America	95,170	3.5	1.89	1.9	54
Middle East and North Africa	56,513	2.6	1.40	2.0	78
Sub-Saharan Africa	46,914	2.6	0.88	0.5	19
Asia[a]	273,280	2.8	1.49	2.1	74
Centrally Planned	586,307	3.0	2.50	3.1	104
China	286,138	4.6	3.24	4.8	104
USSR	179,760	1.6	1.64	1.6	103
Eastern Europe	102,815	2.2	3.57	2.8	125
		Soybeans			
World	93,097	6.0	1.73	2.1	35
United States	50,644	5.0	1.89	1.1	21
Brazil	18,278	19.5	1.80	2.0	10
Argentina	6,750	34.9	2.06	3.4	10
China	9,695	1.1	1.33	2.6	251

SOURCE: Congressional Budget Office, based on data from Department of Agriculture, Economic Research Service.

a. Asia excludes China, Japan, and Middle Eastern Asian countries.

developing countries, excluding China, between 1970 and 1984--more than twice the rate for developed countries (see Table 5).[25] In China and the Middle Eastern countries, it increased by about 30 percent and 25 percent, respectively, over this period. In Sub-Saharan African countries, by contrast, consumption remained essentially the same during this time, with imports, often in the form of food aid, making up for declines in per capita food production. Food consumption in Latin America and Asia improved substantially. In the 1980s, food consumption grew less rapidly everywhere except in China, and it actually fell in Sub-Saharan Africa.[26]

Uses of Major Crops. About one-third of the world's consumption of grain takes place in developing countries (excluding China), where over half of the world's population lives. This fact reflects the much lower levels of per capita food consumption in developing countries. The use of grain, however, is growing much more quickly in developing than developed countries: between 1970 and 1986 it increased by 3.0 percent per year in developing countries and by only 1.2 percent in developed countries (see Table 3). The difference is most striking in the use of grains as animal feeds--almost exclusively coarse grains in developing countries. Feed use has grown by 7.8 percent annually between 1970 and 1986 in developing countries compared with just 1 percent in developed countries (feed grain supplied by developing countries has grown by just 1.5 percent over this period). Consumption of grain directly as food rose by 2.3 percent in developing countries compared with 1.7 percent in developed countries. Only one-fifth of all grain consumed in developing countries is used for animal feed, as against about two-thirds in developed countries, a reflection of the much smaller consumption of meat in developing countries. Nevertheless, those countries clearly represent the fastest growing market for feed grains.

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[25] The 1970 value is an average of 1969 to 1971, and the 1984 value is an average of 1983 to 1985. The trend for protein supplied per capita is similar to that for calories supplied per capita over this time period.

[26] Calories consumed per capita for all developing countries, excluding China, fell from an average annual growth rate of 0.7 percent during the 1970s to 0.2 percent during the early 1980s. Growth in calories consumed over this period declined most severely in the Middle East, from 1.7 percent to 0.8 percent a year, and in Sub-Saharan Africa, from 0.5 percent to -0.7 percent a year (*FAO Production Yearbook*, various issues.)

TABLE 5. FOOD PRODUCTION, CONSUMPTION, AND TRADE GROWTH RATES (Average annual growth rates in percent and calories)

	GDP per Capita		Food Production per Capita		Calories Supplied per Capita[b]		Food Imports		Food Exports	
Region[a]	1965-1980	1980-1985	1975-1981	1981-1986	1969-1971	1983-1985	1975-1981	1981-1986	1975-1981	1981-1986
Developing										
(Less China)	3.9	-0.5	0.6	0.3	2,173	2,364	9.4	0.9	6.2	0.7
(With China)	3.9	1.0	0.9	1.4	2,113	2,424	10.3	0.0	5.2	2.2
Selected Countries										
Latin America	4.0	-1.9	1.0	-0.5	2,517	2,700	11.9	-4.5	6.4	--0.9
Asia	3.9	3.1	1.1	1.0	2,059	2,239	2.3	3.0	7.7	5.3
Middle East	3.9	-3.4	0.4	-0.1	2,397	2,957	14.4	2.5	14.4	-0.5
Africa	3.6	-2.2	-1.8	-0.1	2,103	2,129	10.4	1.6	-1.9	-0.4
Centrally Planned										
China	4.2	8.6	1.8	4.4	1,974	2,564	16.5	-5.8	-2.8	15.6
USSR/Eastern Europe	n.a.	n.a.	-0.5	2.9	3,332	3,410	11.5	-7.5	0.0	-0.2
Developed	2.8	1.7	1.4	0.1	3,231	3,356	2.0	1.6	7.4	-1.6
United States/Canada	2.0	1.5	1.9	-0.9	3,456	3,632	3.8	3.2	7.8	-7.3
Western Europe	3.0	1.2	1.3	1.2	3,261	3,379	1.2	1.0	6.9	4.8
World	n.a.	n.a.	0.6	0.8	2,449	2,666	6.3	-0.4	6.4	-0.6

SOURCES: Congressional Budget Office, from Food and Agriculture Organization of the United Nations, *FAO Production Yearbook 1986* and *FAO Trade Yearbook 1986*; World Bank, *World Development Report 1987*.

NOTE: n.a. = not available.

a. Regional definitions follow standard FAO groupings. China includes other Asian centrally planned economies. Asia excludes China, other Asian centrally planned economies, and Japan, as well as Middle Eastern Asian countries. The Middle East includes Egypt, Libya, and Sudan, and excludes Israel. Africa excludes South Africa, Egypt, Libya, and Sudan. Developed countries include South Africa and Israel. FAO and World Bank country group definitions can differ slightly.

b. Calories supplied is a proxy for per capita consumption. It equals domestic food production plus food imports minus food exports, with a correction for livestock feed use. Calories supplied per capita represents the quantity of food reaching households, all of which may not be consumed because of various losses of edible food and nutrients in the household.

Grain consumption outpaced production in developing countries by 52 million metric tons (mmt) over this period, while in developed countries production exceeded consumption by 144 mmt. As a result, developing countries imported a substantial amount of wheat and coarse grains from developed countries. In rice, however, developing countries, as a group, are roughly self-sufficient. The most rapid increase in grain consumption in developing regions and countries occurred in North Africa and the Middle East, in Indonesia, Brazil, Mexico, and Korea and Taiwan, and in China. In those areas consumption grew between 3.8 percent and 4.6 percent a year, about doubling in the 1970-1986 period (see Table 3). India, on the other hand, raised grain consumption by only 2.1 percent a year over these 16 years, roughly equal to its population growth. Low-income developing countries consumed very little grain as animal feed, while high-income developing countries used as much as one-third to one-half of their grain (all coarse grain) as animal feed. Since it takes two to six kilograms of grain to produce one kilogram of meat, higher meat consumption by developing countries--which occurs as incomes rise--increases demand for grains substantially.

The Declining Self-Sufficiency in Grain Among Developing Countries

Developing countries have become steadily less self-sufficient in supplying their grain needs over the last three decades (see Figure 1). This trend has been especially strong for coarse grains, mainly because of the increase in demand for animal feed in the more advanced developing countries. Also, on the supply side, developing countries have emphasized the production of preferred food grains such as wheat and rice over coarse grains.[27] Even so, growth in food grain consumption has forced developing countries to supply their needs increasingly with imports.

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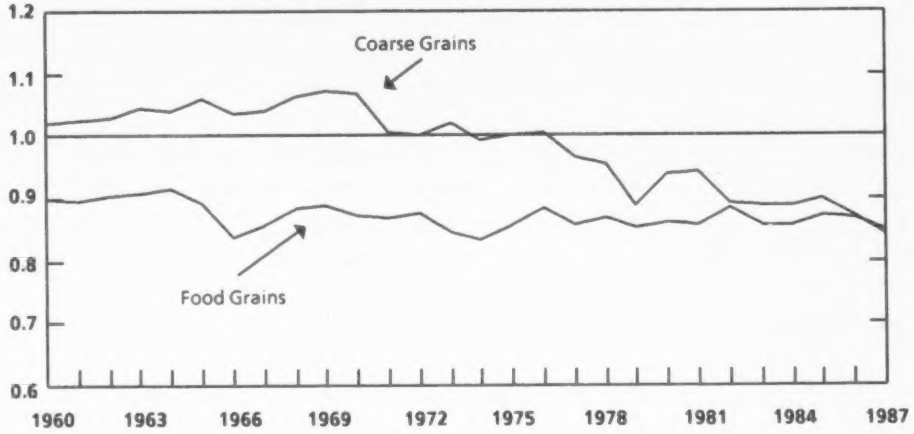
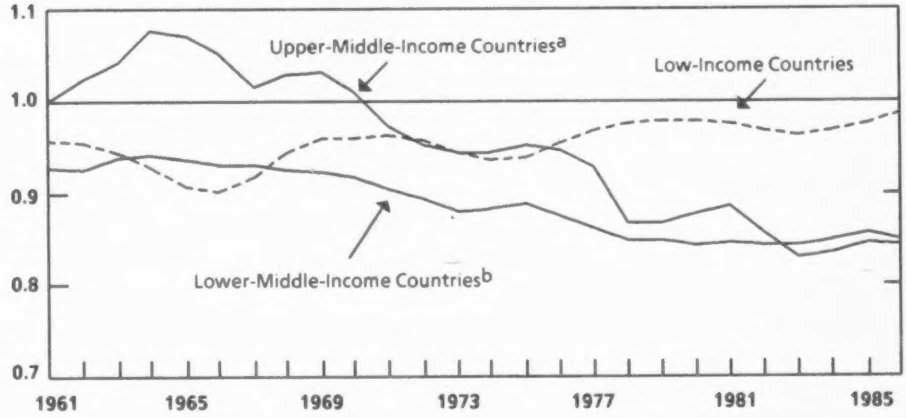
[27] Coarse grains produced in developing countries are primarily consumed directly as food, in most cases as a less preferred food. As incomes rise in many developing countries, people consume less coarse grain and more of the preferred wheat and rice grains. As animal production--primarily poultry and pork in developing countries--increases, imports of coarse grains rise rapidly, as most land is tied up in producing other crops. Chapter II examines food consumption patterns in more detail.

Figure 1.
Self-Sufficiency Ratios for Grains
(1.0 equals self-sufficiency)

All Developing Countries--Food and Coarse Grains



Developing Countries by Income Group--Total Grains



SOURCE: Congressional Budget Office, based on Gary Vocke, "U.S. Grain Imports by Developing Countries," Department of Agriculture, *Issues in Agricultural Policy, Number 542* (May 1988).

NOTE: The self-sufficiency ratio equals domestic grain production divided by the sum of grain production plus net imports. A country with no imports or exports has a self-sufficiency ratio of 1.0.

a. Excluding European countries and high-income oil-exporting countries.

b. Excluding China and other Asian centrally planned economies.

The poorer developing countries generally register higher rates of self-sufficiency in grain production. Middle- and high-income developing countries, many of which have been quite successful in increasing their agricultural production, still find that economic growth increases domestic demand for food even faster, especially for higher-quality foods such as preferred grains and animal products. For the poorest developing countries, self-sufficiency in food is often a sign of economic stagnation.

Some developing countries have achieved self-sufficiency in a major crop--in several cases generating surpluses for export. Indonesia, once the world's largest importer of rice, now fully supplies its own market; India, previously a major recipient of food aid, now produces all its own wheat in most years. Malaysia has become one of the world's largest exporters of vegetable oils, as has Brazil for soybean products. These countries, however, are all major importers of other food products: India is the world's largest importer of vegetable oils; Indonesia and Brazil import large quantities of wheat; and Malaysia is rapidly increasing its import of feed grains.[28] While the success of each of these countries in increasing its agricultural production has to some degree reduced world import demand for certain products, it has at the same time increased world demand for other agricultural products.

International Trade in Food

Food imports by developing countries about doubled during the 1970s, before leveling off during the 1980s.[29] Rapid income growth among developing countries, combined with easy financial terms, spurred import growth during the 1970s. These factors reversed in 1981.

The rapid increase in food imports by developing countries during the 1970s accommodated similar increases in domestic food consumption. Even though production of food grew at a healthy pace, most of the increase in per capita consumption was supplied by imports from developed countries. The rate of growth in food imports fell during the 1980s primarily because of poor economic growth, though in several cases such as India and Indonesia, imports fell because of large increases in domestic production. Food imports grew more quickly in Asian countries on average than in other developing regions during the 1980s, largely because these countries continued to enjoy economic growth while in other regions GDP per capita fell (see Table 5). Growth in food imports declined most in countries where food production per capita fell during the 1980s. Growth in food imports rose only in Asia, where food production per capita remained about constant from the late 1970s to the early 1980s.

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[28] See Gary Vocke, "U.S. Grain Imports by Developing Countries," Department of Agriculture, *Issues in Agricultural Policy, Number 542* (May 1988).

[29] *FAO Trade Yearbook*, various issues.

Grain imports have grown much more quickly in developing countries than in developed countries--at a 6.3 percent annual rate from 1970 to 1986, compared with only 0.3 percent a year (see Table 3). Grain imports by developing countries were about half of worldwide imports. All major developing regions are net importers of food. In 1986, developing countries excluding China imported 96 mmt of grain while exporting only 25. Developed countries, on the other hand, exported 114 mmt more grain than they imported, reflecting the net flow of grains from developed-country exporters to developing and centrally planned importers.

The general trend was broken in the 1980s when several large traditional food importers entered the export markets for grain--notably China with coarse grain and, to a much lesser degree, India with wheat. These countries had increased their production by enough to generate temporary surpluses. Partly because of domestic bottlenecks and partly because of a need to earn foreign exchange, they exported their surpluses instead of consuming them. India and China are not likely to remain exporters of food for long. India's surplus, even given its large increase in production, resulted chiefly from an inability to increase domestic food consumption significantly. As incomes improve in India, it will probably become once again a net importer of grains, but this time through commercial channels rather than through food aid as in the past. China, with a huge latent demand for animal products, has found it difficult to expand animal production because of an inability to use animal feeds efficiently. As China increases its use of animal feeds, coarse grain (and soybean meal) imports will be likely to mount.

U.S. AGRICULTURAL EXPORTS TO DEVELOPING COUNTRIES

U.S. agricultural exports surged during the 1970s as world demand exceeded supply; they plummeted during the 1980s when conditions reversed (see Table 6). Total U.S. agricultural exports expanded almost sevenfold in the period 1970-1980, from $7.4 billion to $42.4 billion.[30] As the residual supplier during this period of excess worldwide demand, the United States increased its imports strongly to all regions and for most agricultural products.[31] When world demand for agricultural products fell during the 1980s, and as U.S. market share declined in response to government policies that made U.S. exports less competitive in price, agricultural exports declined substantially. From 1980 to 1985, the value of exports fell from $42 billion to $30 billion.[32] Exports to developing countries fell by 17 percent during this period, considerably less than the 29 percent to developed countries and 53 percent to countries with centrally planned economies. Overall, the proportion of U.S. agricultural exports going to developing countries increased from 33 percent in 1970 to 42 percent in 1985. Developing countries now take about two-thirds of U.S exports of food grains, and about one-third of U.S. exports of feed grains and soybean products.

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[30] Although export changes were greater in terms of value than in volume--dollar prices rose substantially during the 1970s, and fell considerably during the 1980s--the pattern was similar in both cases.

[31] Until recently, the United States has been the residual supplier of most major food commodities to world markets, much as Saudi Arabia has for oil. A residual supplier expands its output and its exports when world demand grows, and reduces its supply to world markets when world demand slackens, thus moderating fluctuations in world prices. During the 1970s, U.S. farmers increased their output and exports strongly, capturing much of the increase in world demand for food crops. Foreign producers increased their output much more gradually. When world demand for agricultural commodities weakened during the 1980s, and production worldwide continued to grow, prices weakened. After world prices fell to U.S. policy-support levels, the government held U.S. supply off world markets by purchasing domestic output. U.S. farm exports, in those years, were determined effectively by the residual world demand once foreign producers had sold all their output at the support price levels. The Food Security Act of 1985 diminished the U.S. role as residual supplier by reducing dramatically--in many cases by 50 percent or more--the price of U.S. products on world markets, thus expanding U.S. exports by gaining a larger share of the market.

[32] U.S. agricultural exports have rebounded somewhat since 1985 and its market share has increased, partly in response to increases in world demand, and partly from reduced U.S. loan rates and reduced market prices, supported by aggressive government export subsidies.

TABLE 6. U.S. AGRICULTURAL EXPORTS
(Values in millions of dollars)

Year	Total Exports[a]	To Developed Economies		To Developing Economics		To Centrally Planned Economies	
		Value	Percent of Total	Value	Percent of Total	Value	Percent of Total
				All Agricultural Exports			
1965	6,398	4,214	65.9	2,073	32.4	104	1.6
1970	7,419	4,827	65.1	2,448	33.0	144	1.9
1975	22,295	12,036	54.0	7,966	35.7	1,790	8.0
1980	42,403	20,811	49.1	15,423	36.4	5,054	11.9
1985	30,217	14,866	49.2	12,743	42.2	2,370	7.8
				Food Grains			
1965	1,430	442	30.9	982	68.7	10	0.7
1970	1,426	480	33.7	937	65.7	10	0.7
1975	6,151	1,234	20.1	3,866	62.9	786	12.8
1980	7,870	1,445	18.4	4,478	56.9	1,607	20.4
1985	4,447	906	20.4	3,202	72.0	273	6.1
				Feed Grains			
1965	909	838	92.2	62	6.8	8	0.9
1970	863	752	87.1	91	10.5	20	2.3
1975	4,550	3,070	67.5	706	15.5	650	14.3
1980	8,775	3,878	44.2	2,543	29.0	1,786	20.4
1985	5,413	2,104	38.9	1,546	28.6	1,621	29.9
				Oilseeds and Products			
1965	841	655	77.9	167	19.9	20	2.4
1970	1,432	1,133	79.1	281	19.6	17	1.2
1975	3,292	2,589	78.6	578	17.6	40	1.2
1980	6,770	4,731	69.9	1,471	21.7	399	5.9
1985	4,398	2,907	66.1	1,387	31.5	74	1.7

SOURCE: Congressional Budget Office, based on data from Department of Agriculture, Economic Research Service.

a. Total exports include those to several small countries that are not classified in any of the three categories.

Several other trends show the increasing importance of developing-country markets for U.S. agricultural exports. In value terms, developing countries have almost surpassed developed countries as the most important market for all U.S. agricultural exports. During 1986, for the first time, U.S. exports of grain to developing countries exceeded those to developed countries in volume. As policies in the European Community keep U.S. grains from competing with domestic production there, developing countries promise to be the major growth market for U.S. agricultural exports.[33] The capacity of developing countries to expand their imports depends primarily on the extent to which they can increase per capita incomes. Framing an export policy for U.S. agriculture thus requires an understanding of the development process in general, and the key role of agriculture in development in particular.

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33. Governments throughout the world tend to regulate agriculture heavily, greatly affecting world supply, demand, and trade trends. Negotiations are now under way, as part of the Uruguay Round of trade talks, to liberalize agricultural policies. If these succeed, world trade conditions could change considerably by the next century, most likely in favor of U.S. farmers. For an overview of the Uruguay Round negotiations, see Congressional Budget Office, *The GATT Negotiations and U.S. Trade Policy* (June 1987).

CHAPTER II

AGRICULTURE IN DEVELOPING COUNTRIES

Successful economic growth means increasing the average productivity of a country's labor force. Developing countries have pursued a wide range of policies toward this end, but the most successful policies seem to be those that have encouraged domestic market forces to operate in tandem with world markets. In many developing countries, this means abandoning the effort to produce manufactured products that will replace imports and directing resources instead toward sectors in which a country has a natural comparative advantage--most commonly agriculture, mining, and labor-intensive manufacturing.

Within this context, many developing countries have established proagricultural policies, designed to raise the productivity and incomes of farmers and to stimulate the rural economy in general. Such restructurings of policy, combined with advances in agricultural technology, have been a primary impetus in raising agricultural production over the last several decades. The systematic changes that help bring about a dynamic agricultural sector--often keyed to an expansion of international trade--are also highly correlated with increases in real per capita income and greater food imports.

This chapter examines the crucial connection between agricultural and national development, with an emphasis on the role of government policies. The discussion is of necessity general in approach, but highlights some of the actual experiences of developing countries.

THE ROLE OF POLICY IN e~~ECONOMI~~C GROWTH

Expanding the resources and technology available to an economy, and channeling them toward more productive uses, are central to achieving steady increases in standards of living. Along with these steps go the need to cultivate a wide range of social and political institutions, cultural traits, and other noneconomic factors conducive to growth.

The growth process in developing countries is distinguished from that in developed countries by the large-scale changes that must take place, often concurrently, in many aspects of life.[1]

In broad terms, growth is achieved by expanding a country's resources, by improving its technology, and by increasing the efficiency with which both are employed.[2] The resources include unskilled labor, physical and human capital, and natural resources (including land). Economic growth is generated by expanding the supply of these factors and by increasing their productivity. Expansion in the supply of factors occurs with increases in population or in the proportion of the population who work, higher levels of investment, and extended use of land and other natural resources. Increases in productivity depend largely on technological progress, better allocation of resources, economies of scale, and, if resources are unemployed, fuller employment of available resources.[3] In simple terms, a country's standard of living tends to rise as the average productivity of its labor force increases.

Macroeconomic Constraints on Growth

The driving force behind economic growth in developing countries is investment. Investment increases the physical and human capital stock (machinery and skills) and improves the technology that workers and farmers use to produce goods and services. As labor productivity increases, real incomes per capita also increase, setting into motion many of the key elements of the dynamic growth process.

Investment is costly, however. In a closed economy, investment equals--since it must be financed by--saving, where saving is defined

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1. Among the numerous surveys of the economic growth process in developing countries, see Gerald M. Meier, *Leading Issues in Economic Development* (New York: Oxford University Press, 1984); and A. P. Thirlwall, *Growth and Development* (London: MacMillan Press Ltd., 1978).

2. Economic growth in developing countries is generally measured in terms of real gross domestic product (GDP). If growth in real GDP exceeds population growth, average real standards of living increase. Other indicators such as income distribution can be included to form a more comprehensive measure of national welfare.

3. Included here might be the social changes coinciding with modernization in a developing country.

as the difference between total income and consumption. Growth in income per capita generates saving, both because people tend to save part of any increase in their incomes and because income distribution often is skewed toward groups with higher saving propensities (owners of capital or the government) during early stages of economic growth. The problem is to stimulate per capita income growth in early stages of development.

In poor economies, the saving necessary for investment is difficult to come by, since family incomes are predominantly at subsistence levels. Efforts to generate saving would require consumption to fall below subsistence levels, and such a policy cannot succeed without severe coercion.[4] Poor countries normally attempt a more benign policy of raising domestic saving by increasing incomes. It is hard to do this, however, especially when the population may be growing rapidly.

Most countries do not need to rely only on domestic sources of saving to fund investment. Foreign saving can be tapped in a number of ways to augment domestic saving. A country can borrow funds directly on world markets, it can receive economic aid, or it can allow foreign investment. Such net financial inflows represent a transfer of resources into the economy that can, if effectively employed, spur domestic investment and economic growth.

Domestic saving can also be increased through international trade. Balanced trade flows allow a country to raise its real income by specializing in products that it produces most efficiently. Higher income levels induce higher saving. If groups in the domestic economy who gain from trade have higher saving propensities than others, then saving may rise even more. This effect seems to account for the fact that domestic saving increases as export revenues rise. Balanced trade may also increase investment, if exports are composed of relatively fewer investment goods than are imports--reflecting a substitution of domestic consumption for foreign capital goods and services.

While international trade and capital flows can help offset a lack of domestic saving, they introduce an additional constraint on growth--foreign exchange shortages.[5] The supply of foreign exchange is limited by export revenues and financial capital inflows, while demand for foreign exchange depends on domestic economic activity, debt-service requirements, and private financial outflows. Higher exports generate foreign exchange directly, and facilitate foreign borrowing. Domestic growth, however, stimulates the demand for imports and may reduce the supply of goods for export.[6]

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[4] In the Soviet Union, Stalin's brutal farm collectivization program during the 1930s served to extract grain deliveries from the peasantry that would otherwise have been consumed.

--Another constraint on growth occurs when an economy is operating at less than its potential, given available resources. Governments can attempt to stimulate the economy with expansionary fiscal and monetary policies.[7] Export expansion, which has been associated with buoyant economic growth in many developing countries, is also an important stimulus.[8]

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[5] Two researchers have found that foreign exchange shortages were a major limitation to growth for most middle-income developing countries over the last decade. They note that almost every country has relied heavily on foreign borrowing to finance domestic development, especially during the early stages of growth. The recent tightening in international finance markets, illustrated by the Latin American debt crisis, has increased the benefits of expanding exports, since the maintenance of a "reasonable" debt-service-to-exports ratio is required to qualify for continued capital inflows. See Kemal Dervis and Peter Petri, "The Macroeconomics of Successful Development: What Are the Lessons?" a paper presented at the National Bureau of Economic Research Conference on Macroeconomics, Cambridge, Mass., March 13-14, 1987.

[6] Many developing countries pursuing import-substitution industrial policies have found that the imported intermediate inputs, machinery, and parts needed to operate such industries have in many cases largely offset any foreign exchange savings. In Brazil, for example, production in many industries had to be cut back severely during the 1980s because of foreign exchange shortages.

[7] Fighting unemployment with expansionary macroeconomic policy in developing countries often leads to inflation. In most developing countries, production is constrained primarily by scarce factors such as human and physical capital, while unskilled labor is in oversupply. Stimulating the economy under these constraints leads to higher inflation rather than higher employment. As will be discussed in more detail below, more efficient allocation of these scarce resources--say toward unskilled, labor-intensive production--can reduce unemployment. And, in general, such allocation policies are consistent with export-oriented growth strategies. Also, many developing countries have limited direct control over monetary policy to begin with. This is especially true for a number of countries in Africa, who tie their money supply to European or U.S. monetary policy.

[8] Exports can increase in value either because their quantity increases or because their prices rise. A terms-of-trade gain, say from higher prices for a dominant commodity export, increases foreign exchange earnings without any additional commitment of domestic resources. However, if this foreign exchange is not used wisely, the gain may be illusory. Many countries have used such windfalls to establish inefficient productive facilities, which actually retard growth in export quantities and often lead to future economic disruptions when the terms of trade gain dissipates. Greater quantities of exports, on the other hand, require a greater use of resources, which are presumably efficiently employed since they are competitive on world markets. Sustained export-led growth is almost always of this kind.

Resource Allocation and Growth

Growth is also constrained by the effectiveness with which resources are employed. Underdevelopment is characterized by low productivity, and development by a shift of resources toward increasingly more productive uses. Efficient allocation of an economy's resources makes it possible to generate more output from a given endowment of resources. Higher output in turn creates more resources, which make possible still higher output over time. Thus, it is important for developing countries to maximize the productivity of scarce resources.

Decisions about resource allocation involve a multitude of interactions within an economy. Simultaneously, consumers decide which of many goods they want to purchase given their limited funds, and producers choose both what goods to produce and how to produce them, given their limited resources and technology.[9] Activity in one sector affects what happens in other sectors: directly by changing the prices of intermediate inputs or of substitute outputs; and indirectly by altering demand for primary factors, causing wages and the price of capital and land to change and thus affecting allocation of resources in all sectors. For example, under full employment, expansion in output of a sector that uses a particular factor of production intensively, say skilled labor, raises the cost of skilled labor to all other sectors. In the extreme case where one sector controls the entire supply of a factor, any other production in the economy where that factor is a required input may be blocked. The problem of resource allocation in developing countries is particularly important because of shortages in many key factors of production.

Key allocation decisions include: how investment funds are to be rationed among various sectors in the economy, and between types of capital, such as machinery, human capital, or economic infrastructure; the choice of production techniques and relative inputs into the production process; what types of products are to be imported and exported; and whether consumption in general is to be discouraged or some types of consumption favored over others.

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[9] In developing countries, many of these decisions are made under less than perfect circumstances: consumers and producers often are not skilled in acting on information; information is often incomplete or misleading; and government policies and fundamental resource shortages limit feasible choices. Many government policies in developing countries are justified, but such government interventions often introduce more problems than they solve.

THE ROLE OF AGRICULTURE IN DEVELOPMENT

Since food is necessary to life, the production and consumption of food dominate economic activity during early stages of development in most countries. Successful development builds on this agricultural foundation, expanding access to food supplies while shifting some of the resources initially employed in the agricultural sector to increasingly productive uses, both there and in other sectors (see Box 1). A more productive labor force makes possible higher real incomes in general, and better access to a nutritional diet in particular.

Agriculture's role in the development process is in no way passive. A prosperous agriculture can fuel growth in other sectors, especially the highly productive industrial sector, by supplying key resources--most importantly, labor, savings, access to foreign exchange, and food. Rural incomes also provide much of the demand for the goods and services produced by other sectors. By all accounts, poor agricultural performance stunts development. A dynamic rural economy, conversely, helps to overcome many of the key barriers to development.

During the last two decades, in a major reversal of strategy, many developing countries--especially in Asia--have initiated policies more favorable to agriculture, stimulating increases in agricultural production and, often, overall economic growth as well.[10] A key element of many of these reform packages has been higher prices for farmers, usually leading to higher prices for consumers, placing a burden on the poor. This "food price dilemma"--the need to maximize the gains of farmers, who are often predominantly poor, while minimizing costs to poor consumers--is a fundamental challenge for food policy in developing countries. As Timmer, Falcon, and Pearson state:

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[10] For a thorough examination of food policies in developing countries, see: C. Peter Timmer, Walter P. Falcon, and Scott R. Pearson, *Food Policy Analysis* (Baltimore: The Johns Hopkins University Press, 1983); J. Price Gittinger, Joanne Leslie, and Caroline Hoisington, eds., *Food Policy: Integrating Supply, Distribution and Consumption* (Baltimore: The Johns Hopkins University Press, 1987); and World Bank, *The World Development Report 1986* (New York: Oxford University Press, 1986). This section relies especially on Timmer, Falcon, and Pearson for background and a conceptual framework.

BOX 1

CHARACTERISTICS OF KEY STAGES OF GROWTH

A recent survey by Lloyd Reynolds of the economic growth experiences of almost every major developing country between 1850 and 1980 provides a number of valuable insights into how most developing countries advance. He identifies three chronological, but not irreversible or automatic, stages of economic growth that developing countries pass through: intensive growth, a turning point, and extensive growth.

Intensive Growth

Intensive growth occurs when output grows at about the rate of population growth. Although per capita incomes are not rising during this stage, which can last for many centuries, a number of changes occur that begin to set the conditions for boosting per capita incomes. Higher levels of output induce increases in population; agriculture expands, in acreage, productivity, and crop diversity; industrial output grows roughly in line with agriculture, but production gradually shifts away from households and handicrafts to more specialized workshops, cottage industries, and factories; small technological changes accumulate; the volume of internal trade and transportation increases, and urban centers develop; and nation-building ensues. But the government sector and foreign trade generally do not expand much, and no major structural shifts occur in the economy during this stage.

Turning Point

An economy achieves a turning point when it begins a sustained period of income growth per capita. The transitional period may last as long as a decade, and is associated commonly with: an acceleration of agriculture and minineral production; increases in exports (generally dominated by primary commodity exports), both in absolute terms and relative to total national output; and political events that lead to more stable and progressive (growth-oriented) governments. Turning points are marked by an acceleration in national output above rates of population increase, with an increasing proportion of output exported.

Extensive Growth

Extensive growth is characterized by significant shifts in the structure of an economy. Although the share of agriculture in national output tends to decline, agricultural production tends to increase in absolute terms. Agriculture provides an important source of exports, food supply, and employment, throughout the initial stages of extensive growth. Resources shift toward more productive industry and services, forming the basis for sustained growth. Industrialization increases specialization, and the demand for infrastructure and trade. Internal and external trade both become more important, increasing demand for a wide range of complementary services, especially transportation, finance, and merchandising. Leading industrial sectors in the early stages of intensive growth are usually those producing basic consumer necessities, especially clothing, that substitute for imports. Much of this initial import substitution occurs naturally, without policy inducements. Agricultural employment may not decline in absolute terms until well into the extensive growth stage, as the growing population fuels employment expansion in industry and services. Real wages do not increase substantially for some time, as surplus labor is slowly absorbed. Regional differences in income levels usually widen during early stages of extensive growth, but then decline as free internal trade provides equalizing influences.

Later stages of extensive growth, eventually leading to full development status, are marked by rising real wages, the decline of agriculture, the spread of modern industrial techniques throughout the economy, and increasing reliance on foreign trade. The distribution of income evens out, and population growth begins to decline.

SOURCE: Based on Lloyd Reynolds, *Economic Growth in the Third World, 1850-1980* (New Haven: Yale University Press, 1985).

> Policies that significantly improve production incentives for farmers often result in reduced food intake for many poor consumers. Broad strategies designed to keep food cheap for these poor consumers have negative production consequences and macroeconomic ramifications that can stifle the economic development process....The inverse impact of food prices on producers and consumers creates a significant dilemma for policy by separating the short-run interests of the poor from their long-run interests.[11]

One lesson of experience with food policy in developing countries is that any successful resolution of the food price dilemma must be approached in a systematic way--integrating policies governing agriculture with other economic policies. Without stable and compatible macroeconomic and trade policies, agricultural policies rarely operate effectively. Much is yet to be learned about how best to design and carry out such reforms. For example, a major question that has stymied experts on development is to what degree the lessons learned from the successful food programs in Asia can be transferred to Africa.

As more developing countries recognize the advantages of a dynamic agricultural sector, they are increasingly focusing on four fundamental objectives of food policy:

- Efficient growth in the food and agricultural sector;
- Improved income distribution, primarily from the expansion of employment;
- Adequate food and nutrition for the entire population through provision of a minimum subsistence floor; and
- Food security to insure against bad harvests, natural disasters, or uncertain world food supplies and prices.[12]

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[11] Timmer, Falcon, and Pearson, p. 283 and p. 271.

[12] See Timmer, Falcon, and Pearson, p. 14. A fifth goal for some countries might be stable growth in foreign exchange earnings from agricultural commodity exports.

Efficient Growth in Agriculture

Efficient growth in the agricultural sector implies productivity gains both in agriculture and in other sectors of the economy. A more productive agriculture generates more food with less labor, freeing workers to move to higher-paying jobs in other sectors.

An "efficient" level of growth in agriculture is not easy to define. The criterion of efficiency must take into account all other uses of scarce resources in the economy. Favoring one sector may impede growth in other sectors that are denied use of the scarce resources. Overzealous encouragement of agriculture, for instance, uses up government funds and foreign exchange that could be spent more productively elsewhere. Efficient growth for any one sector implies that no other allocation of resources could yield better results in terms of economic growth or, more broadly, social welfare.

Setting policies to achieve efficient growth requires an allocation of investment in each sector, so that investment will flow to those sectors where it yields the greatest social net benefit.[13] A key element in social benefit calculations is the comparison of international market prices. The national benefits from producing a good must be weighed against the savings that would result from importing it if it is available on world markets at a lower price. There may be social and economic advantages in producing goods that take the place of imports, but if these advantages are purchased at a cost that outweighs the benefits, resources are wasted.

Improved Income Distribution

Since most people in developing countries--including poor people--live in rural areas and are employed in activities related to agriculture, a successful development policy will have wide-ranging effects on the distribution of income. As agriculture prospers, farm output and incomes will rise, thereby increasing the demand for labor to work on farms. A vibrant agricultural sector stimulates the whole rural economy, further increasing the demand for rural labor. Many gain, but not all. Those who suffer the most tend to be poor. The factors that lead to stronger agricultural performance--such as technological advances, increased use of machinery, and higher prices for farm output--penalize those workers whose jobs are replaced by machines and who cannot find new, comparable employment, as well as those who cannot afford to pay higher prices for food. In both cases, those at the bottom--the landless and unskilled throughout the country, especially children and women--tend to bear the greatest burden. Governments in developing countries need to protect the poor from the negative effects of economic growth. This may call for policies to assist the poor, possibly at some cost in economic growth. The only long-run solution for poverty, however, is to create constructive employment for the poor, which is integrally linked to development of the agricultural sector.

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[13] In well-operating markets, profits and wages provide indicators of private and social benefits. In developing countries, where markets do not always function optimally, governments may try to alter market incentives, or to bypass markets altogether, to allocate resources in ways they deem more "efficient." In such cases, it is wise to examine all the costs and benefits of a policy to make sure that the net benefits are real.

Adequate Food and Nutrition

Providing adequate levels of food and nutrition to every household should be a fundamental objective of food policy. In this area, humanitarian motives coincide with the political and economic self-interest of governments. A healthy work force contributes to economic development. The provision of a minimum subsistence floor protects the poor, and helps to achieve a better income distribution.[14]

Malnutrition occurs in different forms for different reasons to different people. Poor people suffer disproportionately from all types of malnutrition, with young children, pregnant and lactating women, and the elderly particularly vulnerable. Malnutrition can be acute, leading to starvation; or it can take the form of ongoing deficiencies in the body's supply of nutrients. Acute malnutrition, whatever the cause, calls for an immediate increase in calorie consumption--often supplied by international emergency relief efforts. Chronic malnutrition is unyieldingly linked to poverty--poor people simply cannot afford a well-balanced diet. Chronic malnutrition can best be remedied by raising the real incomes of the poor.

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[14] Estimates of the number of undernourished people worldwide vary considerably, ranging from 450 million people estimated by the Food and Agricultural Organization to 840 million people estimated by the World Bank and to 1.3 billion people estimated by the International Food Policy Research Institute. See Walter Falcon and others, "The World Food and Hunger Problem: Changing Perspectives and Possibilities, 1974-84," in J. Price Gittinger, Joanne Leslie, and Caroline Hoisington, eds., *Food Policy: Integrating Supply, Distribution and Consumption* (Baltimore: The Johns Hopkins Press, 1987).

Reducing malnutrition may require short-run intervention by governments. Some forms of malnutrition, such as various vitamin-mineral deficiencies, have been successfully countered by combining "technical fixes" consisting of food fortification or mass distribution of the missing nutrient with nutritional education campaigns. Policies that inexpensively supply staple foods to the poor help to relieve calorie-protein deficiencies.

Food Security

The objectives of food policy discussed above cannot be met if the economy is disrupted by bad harvests or uncertain world market conditions. Food security does not imply self-sufficiency at any cost, but having the resources to meet short-term supply disruptions.

At the household level, food security may be attained in different ways. Households are not equally vulnerable to food shortages. Most farmers, and many others with at least a garden plot, produce the bulk of their own food. A poor crop for most of these households means less farm output available for sale on markets--possibly with some compensation from higher prices--but the farm household generally does not curtail its consumption significantly. Urban dwellers, and those in rural areas without access to land, must purchase most of their food in the market with cash. For these people, food security depends on having enough income, or savings, to purchase the food they need. A decline in earnings, or higher food prices, reduces their food security. Given this greater risk, urban dwellers need savings and other forms of insurance against such predicaments, and governments may try to provide them with a subsistence safety net.

Nations achieve food security in much the same fashion as households. Countries that normally produce food surpluses may ~~be~~

forced to reduce their exports during periods of crop failure, but domestic food consumption rarely falls.[15] Food-exporting countries gain when world food prices rise. (Higher food prices may create inequities within the country, though.) Food-importing countries are much more vulnerable to the vicissitudes both of domestic food production and of international markets. They need a sufficient supply of foreign exchange, and possibly domestic buffer stocks. A clear trade-off exists between food security programs and overall economic growth: excessive concern for food security can hinder overall economic growth. Food security is best provided by efficient agricultural growth, which in many cases does not mean self-sufficiency.

International trade is a key element of any nation's food security. In general, depending on their specific resource endowment, agriculture-based economies should supply most of their own staple food needs. Countries may embark on programs to promote production of traditional staple foods to reverse bad policies that caused food production to fall short in the first place.[16] Self-sufficiency in food can be achieved by countries with poor agricultural resources at a price--though perhaps, as in the case of Saudi Arabia, which now has a wheat surplus--at a price far higher than the benefits gained.

SUPPLY AND DEMAND IN AGRICULTURE

Agricultural conditions vary among countries, and sometimes even among regions of the same country. Even so, a number of regularities exist. In all developing countries, agricultural production is decision-intensive. Millions of households farming small plots in Asia and Africa have to make the same decisions as managers of large estates in Latin America: decisions about when to plant and what to plant, how to grow a crop and when to harvest and sell it. Consumers and producers of agricultural products throughout the developing world respond rationally to market incentives, in an effort to improve their standards of living given the options before them.[17] These regularities in human behavior make it possible to identify a number of key economic relationships common to agriculture. Expressed in terms of supply and demand, they provide the basis for most analysis of agricultural activity in developing countries.

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[15] Food consumption can, of course, fall to very low levels, resulting in famine conditions.

[16] In these cases, domestic prices may be held somewhat above world prices to induce more domestic output, but eventually domestic prices should revert to levels equal to long-term world market trends. Self-sufficiency in foods that cannot be produced competitively except with large domestic subsidies is rarely a sound policy.

Determinants of Food Production

Food is produced in a wide range of settings throughout the developing world, ranging from large estates to millions of small household plots. Most food, however, is grown on small plots by individual households. Farm families typically supply their own capital, make the managerial decisions, and provide the basic labor to operate the farm. Most of the food consumed by farm households is grown on their own farms, with surpluses sold on the market. Farm production and marketing decisions, therefore, depend not only on the direct returns to farming, but on many other considerations, including the productive capabilities of the household, income opportunities outside of farming for members of the household, the food requirements of the household, the prices of consumer goods bought on the market, their desire for leisure, their aversion to risk, and so on.

As a general proposition, farmers increase the output of their most profitable crops. They do so the higher and the more certain the output price; the lower the input costs; the more productive the available technology; and the more modern and adaptable the farmer and farm institutions to changes in incentives. Relative crop prices, and differences in their respective input prices, also influence the types of crops grown by farmers. For example, a decline in the price of an export crop like rubber increases the relative producer price for food, causing farmers to shift production toward food. The magnitude of this response in the short run depends on the availability, price, and quality of primary factors of production such as land, labor, machinery, and other farm inputs. Nonagricultural prices, wages, and capital costs also influence farm production decisions.

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[17] Rational behavior in no way guarantees rational (efficient) outcomes. Rational consumer and producer responses to poor government policies, or within a context of market failures, often generate irrational economic activities.

Researchers have tried to estimate how producers respond to changes in output price. Estimates of the elasticity of supply vary considerably among products and countries, but a rule of thumb is that the production of cereals in developing countries increases about 0.2 percent to 0.3 percent for every 1 percent increase in output price in a particular year.[18] For price increases lasting several years, these supply elasticities are roughly double since farmers have time to invest in structural changes to increase their productive capacity. The greater and more prolonged response to long-run price increases creates a momentum that is of far-reaching consequences. Farm production rarely increases dramatically in the short run (unless rebounding from some type of catastrophe), but once the capacity is in place to increase output, production tends to respond persistently.

Government Policy Levers. Governments can influence food production decisions by altering the basic conditions facing producers. Intervention normally focuses on four targets: pricing policy, risk, technology, and agricultural and rural infrastructure. Since these concerns are interrelated, and the pursuit of one may require progress in another, policy packages may have to combine elements of each to be successful. Also, policies must take account of production incentives for a large number of farm households.

Pricing Policies. Farmers' incentives can be altered by pricing policies. Some developing countries, attempting to exploit the inelastic supply response of farmers, have kept agricultural prices low relative to prices for other goods, hoping in this way to hold down food prices. This approach often has been reinforced by policies that raise input prices for farming--such as import quotas on fertilizer. In addition, exports of agricultural products often are taxed, or made more expensive on international markets by overvalued exchange rate policies. Such pricing policies also affect farmers' decisions about what types of crops to produce, especially their choices between food crops and cash crops for export. The policy of keeping agricultural prices low has led consistently to lower food production, aggravating rather than solving the food supply problem.

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[18] See Timmer, Falcon, and Pearson, pp. 107-109. Farmers in Sub-Saharan Africa respond less strongly to price increases (by about one-half), as noted by Uma Lele, "Growth of Foreign Assistance and Its Impact on Agriculture," in John Mellor, Christopher Delgado, and Malcolm Blackie, eds., *Accelerating Food Production in Sub-Saharan Africa* (Baltimore: Johns Hopkins University Press, 1987), p. 336. Supply elasticities tend to be higher in developed countries, where production is more adaptable.

Raising output prices, on the other hand, has been a key component of most successful programs to increase farm output.[19] To lessen the impact on consumers, farm profitability can be increased by lowering input prices rather than increasing output prices.[20] Input prices can be lowered by subsidizing the prices of fertilizer and pesticide, by subsidizing investment in irrigation and other infrastructure, and by providing farmers with preferential financing arrangements.

Risk. Farmers in developing countries are quite sensitive to risk, since a bad year for a subsistence farmer can be life-threatening. Stabilizing prices over the growing season reduces price risk for producers, and programs such as irrigation can make farming less susceptible to weather and pests. Credit schemes adapted to the needs of small farmers can reduce ~~financial~~ risk and offset some of the limitations of the capital market.

Technology and Infrastructure. Eliminating perverse price incentives for producers can spur production rapidly, as demonstrated by China's liberalization of farm prices. After such gains have been realized, however, further growth in production is limited by technology and infrastructure. In agriculture, technological advances normally involve some combination of higher-yielding seeds (or animals) and the more intensive and efficient use of fertilizer or animal feeds. Technological innovations have contributed substantially to higher yields in agricultural production throughout the world. Changes in infrastructure--irrigation, extension services, and transportation facilities--complement other agricultural policies.

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[19] Governments can buoy farm output prices in several ways. In most developing countries, demand exceeds supply and food prices have a tendency to rise. If international prices are high as well, a "hands off" policy provides favorable production incentives. Alternatively, governments can support prices by purchasing surplus output. They can maintain buffer stocks to stabilize output prices, helping to lower risk for producers. When food is imported, governments can impose import restrictions to raise domestic food prices.

[20] Developing countries rarely have the financial resources to employ direct producer subsidies.

Higher Yields as a Focus of Policy. Most growth in agricultural production over the last several decades has resulted from higher yields, brought about through an interaction between monetary incentives and basic productive capabilities. Most of the recent gains in yields have come from technological improvements. Government policies have been most successful when they were designed to spread such technological advances among many small farmers, in combination with favorable price incentives. The typical package incorporates a core technology of high-yielding seeds, high rates of fertilizer and pesticide application, and improved irrigation facilities, supported by government extension services, favorable prices for farmers, and, often, financial assistance. In Latin America, increases in the acreage planted have been important in raising output: investment in equipment, such as tractors, has worked in combination with productive seed technology to enhance yields.

Yields have been stagnant in Sub-Saharan Africa, partly because government pricing policies have discouraged agricultural production, but also because of difficulties in implementing technical advances. For a variety of political, agronomic, climatic, and social reasons, the drive to introduce yield-enhancing technological innovations in Sub-Saharan Africa has encountered more obstacles than in other parts of the world.

Agricultural growth in developing countries may have reached a plateau. In the last five years, growth in yields has leveled off in most developing countries, suggesting that any further significant growth must await new breakthroughs. In Sub-Saharan African countries, yields have remained stagnant for at least the last 25 years (see Box 2). As population continues to grow (and, in some cases, per capita incomes), developing countries may soon experience a new surge in demand for food imports from the developed countries.

BOX 2

REVIVING AFRICAN AGRICULTURE

Only Sub-Saharan African countries have failed to increase agricultural productivity significantly over the last several decades. The meager gains achieved in African food production over this period have resulted almost solely from acreage expansion, while crop yields have remained essentially constant over the last 30 years. During the 1960s, when food shortages racked Asia, the African countries exported more food than they imported. Since the early 1970s, Sub-Saharan Africa has become increasingly dependent on food imports--through both food aid and commercial purchases--to meet rising demand. Recurring famine in several African countries during the 1980s has focused world attention on how to increase the quantity and reliability of food production in Africa.

Causes of the poor performance of African agriculture are systematic and complex. Poor soils and limited water resources present a natural handicap to agriculture in Africa. Africa also lacks human resources: many rural areas are underpopulated, few Africans are educated and trained adequately, and health care and nutritional supplies are deficient. Transportation, communication, and other rural infrastructural services are substandard. Government pricing policies often have penalized agriculture, and the lack of trained government manpower has limited the effectiveness with which favorable policies have been applied. Until recently, agricultural research--including the agricultural sciences, and economic, social, and political research--has been neglected. All of these factors have contributed to the striking inability of Sub-Saharan African governments to develop and implement technologies that raise land yields and labor productivity. Such technological gains have been the cornerstone of Asia's green revolution.

More money and better policies are needed to revive agriculture in Sub-Saharan Africa. The enormity of the task demands a partnership between African and developed countries, and the international agricultural and financial institutions such as the FAO and the World Bank. Large investments in agricultural infrastructure, education, health care and research are required. Much of this funding must come from aid and preferential lending, but African governments also can contribute importantly with policy changes that shift domestic resources out of high-cost, capital-intensive industrial projects into the agricultural sector. Food prices have been rising in relative terms throughout most of Africa, in response both to the excess demand in local markets resulting from food shortfalls and to government policy changes. Foreign aid has also risen significantly during the 1980s. Yet production growth has faltered. The lesson is that "getting prices right," and higher aid flows, must be integrated with improved research and government services into a sustained, systematic effort to raise agricultural productivity. Given the limited resources available, such an effort is most likely to succeed initially by targeting a few key staple crops in regions with favorable growing climates.

Characteristics of Food Demand

The basic food-consuming unit in developing countries is the household or family.[21] A household's food consumption is determined by the relative prices of different food products, its real income, and the types of food preferred.

These demand relationships change in a predictable way as incomes grow. Poor households must spend a large part of their total income on food to survive. As incomes increase, however, the proportion of total income spent on food declines steadily, while the quantity of most types of food consumed continues to increase.[22] The demand for preferred staple carbohydrates, such as rice and wheat, increases strongly as incomes of the poor rise, or when prices of these foods fall.[23] Eventually, as income levels rise, the demand for starchy staple foods levels off, while the demand for animal products--a luxury for most in the developing world--increases. These household consumption patterns are reflected at the national level in developing countries.

Three distinctive features of food consumption can be seen in most developing countries, compared with patterns in developed countries:

- Consumption of calories and protein per person is lower, often much lower, than in developed countries;
- Food consumption increases much more quickly in developing countries as per capita real incomes increase; and

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[21] Food also must be distributed within the household. Unequal distribution of food within the family is a cause of malnutrition for some children, women, and the elderly. Studies have shown that the role of women in the household significantly affects this distribution--the greater the role of women in the production of food, or the more income earned by women, the more food within the household is made available to children and women. See several articles in Gittinger, Leslie, and Hoisington, Part V, for more on the essential contribution of women to food and nutrition consumption in developing countries.

[22] The quantity of food consumed eventually levels off among those with high incomes, once the capacity to consume calories is reached. Expenditures on food may continue to rise, however, as higher-quality, more expensive types of food are consumed.

[23] For several inferior foods, most commonly low-nutrition starches such as cassava and potatoes, demand falls as per capita incomes rise. Higher incomes allow consumers to shift from these inferior foods to preferred foods.

- o Calorie and protein consumption in developing countries is predominately from vegetable rather than animal sources, although a shift toward animal sources occurs as income levels rise.

People in developing countries consume about 72 percent of the calories that people in developed countries consume (see Table 1, Chapter I). In low-income countries, excluding China and India, the calorie intake is only 61 percent of levels in developed countries. In most developing countries, both calories and protein are derived mainly from one starchy food: rice or wheat in much of Asia; sorghum and millet, rice, or tuber crops such as yams and cassava in various regions of Africa; and corn, rice, wheat, or potatoes in various parts of Latin America.

In Indonesia, the pattern of food consumption is representative of that in most developing countries (see Table 7). About half of the total calorie and protein intake per capita comes from a starchy cereal--rice in this case. Cereals and starchy foods combined provide about three-fourths of the calories and about two-thirds of the protein. The rest of the protein in the diet of Indonesians comes mainly from nuts and oilseeds, especially soybeans. Animal products are insignificant in the Indonesian diet, accounting for just 2 percent and 11 percent of the calories and protein respectively. In Indonesia, as in most poor and lower-middle-income developing countries, meat, and the feed grains needed to produce meat, are low-priority luxuries.

The proportion of income spent on food decreases steadily as incomes increase. On a cross-sectional basis, this pattern can be seen within a country among different income groups, and among countries having different income levels. In Indonesia, expenditures on food declined from about 68 percent in 1978 to 62 percent in 1981 as real per capita income grew significantly (see Table 8). Expenditures on food increased slightly between 1981 and 1984, however, as per capita income fell because of poor economic growth over that period. Spending on food as a proportion of total expenditure also varied by income status. In 1984, the lowest-income group devoted almost 72 percent of its expenditures to food as compared with 42 percent for the highest-income group. Moving upward on the income scale, the proportion of expenditures going to cereals (predominately rice) drops from about

TABLE 7. FOOD CONSUMPTION PER CAPITA IN INDONESIA IN 1984, BY KIND OF FOOD

	Calories per Day		Protein per Day	
Kind of Food	Calories	Percent of Total	Grams	Percent of Total
Vegetable	2,460	97.8	46.9	88.8
Animal	57	2.2	5.9	11.2
All Food	2,516	100	52.8	100
	Vegetable Food			
Cereals	1,664	66.1	33.3	63.1
Wheat flour	62	2.5	1.5	2.8
Rice	1,383	55.0	26.1	49.4
Maize	216	8.6	5.6	10.6
Starchy Food	234	9.3	2.0	3.8
Cassava	182	7.2	1.5	2.8
Sweet potatoes	34	1.4	0.5	0.9
Sugar	111	4.1	0.1	0.2
Nuts and Oilseeds	217	8.6	10.2	19.3
Ground nuts	40	1.6	2.3	4.4
Soybeans	59	2.3	6.2	11.7
Coconuts	108	4.3	1.0	1.9
Fruits	35	1.4	0.5	0.9
Bananas	23	0.9	0.3	0.6
Vegetables	14	0.6	0.8	1.5
Oils and Fats	184	7.3	0.1	0.2
Coconut oil	63	2.5	0.1	0.2
Palm oil	103	4.1	0.0	0.0
	Animal Food			
Meat	19	0.8	1.4	2.7
Beef	5	0.2	0.4	0.8
Pork	6	0.2	0.2	0.4
Chicken	4	0.2	0.3	0.6
Eggs	8	0.3	0.6	1.1
Milk	7	0.3	0.3	0.6
Fish	20	0.8	3.6	6.8

SOURCE: Congressional Budget Office, based on data from *Statistical Yearbook of Indonesia 1986* (Jakarta, Indonesia: Central Bureau of Statistics, 1987).

TABLE 8. AVERAGE MONTHLY EXPENDITURES PER CAPITA IN INDONESIA, BY TYPE OF EXPENDITURE
(In dollars and percent)

Type of Expenditure	Monthly Expenditures (In percent)			Monthly Expenditures by Income Class for 1984 (In percent)		
	1978	1981	1984	Less Than $15.00	$15.00 to $30.00	More Than $30.00
Food						
Cereals	24.9	20.9	19.3	30.8	17.5	5.7
Cassava	1.6	1.0	1.3	2.1	1.1	0.5
Fish	5.9	6.7	5.7	4.9	6.5	3.5
Meat	3.4	2.4	2.7	1.0	3.0	4.2
Eggs, milk	2.1	1.6	2.3	1.0	2.7	2.9
Vegetables	5.4	5.8	5.7	6.9	5.9	3.1
Nuts	2.5	2.3	2.3	2.4	2.4	1.4
Fruits	2.5	2.2	2.7	1.9	2.9	3.0
Miscellaneous food	10.1	10.1	9.8	11.4	10.1	5.7
Prepared food	4.6	3.4	6.2	4.3	6.5	7.8
Alcoholic beverage	0.1	0.1	0.2	0.1	0.2	0.4
Tobacco	5.0	5.1	5.1	4.6	5.7	3.6
All Food	68.1	61.5	63.2	71.5	64.4	41.6
Non-Food						
Housing, utilities	13.6	14.4	17.4	15.9	16.8	23.8
Miscellaneous goods, services	5.8	8.6	8.3	3.6	8.1	17.3
Clothing	4.7	6.5	4.6	4.6	4.7	3.8
Durable goods	3.7	4.6	3.1	1.2	2.7	8.5
Consumption taxes, insurance	1.5	1.1	0.9	0.5	0.8	2.1
Ceremonies	2.7	3.2	2.6	2.6	2.5	2.9
All Non-Food	32.0	38.5	36.8	28.5	35.6	58.4
Total (In percent)	100.0	100.0	100.0			
Total (In U.S. dollars)	13.40	17.54	15.72			

SOURCE: Congressional Budget Office, based on data from *Statistical Yearbook of Indonesia 1986* (Jakarta, Indonesia: Central Bureau of Statistics, 1987).

31 percent for the lowest-income group to about 6 percent for the highest-income group.[24] Relative spending on meat and prepared foods generally rises as incomes rise.

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[24] The poorest in Indonesia spend more of their income on starchy foods considered inferior to rice, such as corn and cassava, because of the relatively higher price of rice. See Timmer, Falcon, and Pearson, pp. 23 and 29.

Several studies have attempted to generalize the relationship between food consumption patterns and per capita income among a large number of countries. One recent study shows that consumers substitute preferred food grains such as wheat and rice for less-preferred coarse grains as their incomes rise from low levels.[25] As economies progress into advanced developing and developed stages, the proportion of the diet made up of animal products increases. At high levels of income, the proportion of the diet accounted for by both grains and meats falls, as that of processed foods increases.

The same study also estimated income elasticities of demand for grains and meats (that is, how much the quantities consumed respond to changes in income). The income elasticities for food grains and meats are positive and high in most low-income and lower-middle-income developing economies, implying that rising per capita incomes induce large increases in the demand for food--to the point where domestic supply may be unable to keep pace.[26] The income elasticity of demand for food grains falls for advanced developing countries, but stays positive and high for meats until well into developed-country income levels. In short, as incomes rise, prospering developing countries increase their demand for grains and meats (and animal feeds) at a much faster pace than do developed countries. This pattern indicates that the demand for U.S. agricultural exports depends to a large extent on economic growth in developing countries.

The Distribution of Food to Consumers

Food producers and consumers are linked by a series of markets. In some cases, farmers sell their produce directly to consumers. More commonly, middlemen buy the output and distribute it to consumers. This marketing function encompasses storing the product, transporting it from buyers to sellers, and processing and packaging it.

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[25] See Suzanne Marks and Mervin Yetley, *Global Food Demand Patterns Over Changing Levels of Economic Development*, U.S. Department of Agriculture, ERS Staff Report No. AGES870910, October 1987. Marks and Yetley, using data from 105 developing and developed countries from 1961 to 1981, examined only the direct consumption of coarse grains as food. While the direct consumption of coarse grains as food declines as incomes rise, the use of coarse grains as animal feeds increases as incomes and the consumption of animal products rise.

[26] Marks and Yetley found that the income elasticity of demand for food grains rose rapidly as per capita incomes increased from low levels, eventually leveling off at between 1.0 and 1.4 for per capita incomes ranging from $500 to $1,800. It remained above zero until per capita income levels exceeded $3,300. The income elasticity for meat stayed between about 0.5 and 0.9 for income levels below about $5,000, and did not become negative until they reached $7,200.

Developing countries have long struggled to control marketing costs. Reducing the cost of middlemen increases returns to producers and/or lowers prices for consumers. In some cases, poorly developed markets allow middlemen to reap unfairly large gains. Many governments have tried to establish state marketing operations, not only to reduce these costs, but to implement price controls and rationing schemes. In most cases, however, state marketing boards fail to perform marketing services effectively, often burdening suppliers and consumers with higher costs. Another way of reducing marketing costs is to improve transportation and communication.

AGRICULTURE AND NATIONAL ECONOMIC POLICY

Evidence is mounting that policies aimed directly at the agricultural sector rarely operate effectively unless other economic policies support them and complement them.

Agricultural production is particularly sensitive to exchange rate policies. Developing countries often follow a policy that overvalues their currencies in real terms, which reduces the domestic currency price of internationally traded goods relative to other goods. An overvalued currency effectively taxes exports and subsidizes imports. This acts directly to discourage the production of agricultural products for export (and all other nonsubsidized exports). Lower exports in turn lead governments to impose import controls to ration the use of scarce foreign exchange. As a result, imports essential for agricultural production are often given low priority as against imports for favored industrial sectors. Not only do the latter receive preferential access to imports, but their output prices are often inflated by trade protection policies. As a result, industry absorbs large amounts of domestic investment, trained workers, and government resources at the expense of agriculture. Since many of these favored industrial projects prove not to be competitive on world markets, they add further to the country's economic difficulties.

Overvalued exchange rates also tend to hold down food prices for consumers. Lower food prices stimulate the domestic demand for food, while creating disincentives for domestic food production. If food imports rise, the foreign exchange shortage is exacerbated. Lower food prices do not necessarily favor the poor, since most of the poor live in rural areas where low food prices may reduce their real income.

The discrimination against agricultural production that is inherent in many industrial development strategies makes it almost impossible for the agricultural sector to prosper. Policies designed specifically to help agriculture--such as input subsidies, export subsidies, and import barriers--in many cases only partially offset this economywide discrimination. Increasingly, efforts are being made to raise the relative prices of agricultural products as part of a more comprehensive effort to reduce price distortions throughout the economy. "Getting prices right," both in macroeconomic and sectoral terms, has become almost a necessary condition for agricultural development.

AGRICULTURAL DEVELOPMENT AND FOOD IMPORTS

This chapter has explored the link between agricultural development and food imports. A developing agriculture contributes to overall economic growth and rising per capita incomes. Since poor people spend a large proportion of new income on food, the demand for food increases--in most cases, faster than the domestic food supply. Demand is strongest for high-quality grains in lower-income countries, and for animal products in advanced developing countries. Countries are most likely to increase their food imports when the international financial terms are good, when food prices are low, and when their balance of payments situation is strong.

The positive relationship between agricultural development and food imports has been demonstrated by a wide range of empirical research. One prominent study finds strong support for the relationship in low-income and lower-middle-income developing countries, but less support in upper-middle-income countries.[27] A 10 percent increase in agricultural productivity (measured as value added per agricultural worker) was associated with a 10 percent to 12 percent increase in gross domestic product per capita for low-income and lower-middle-income economies. Correspondingly for these countries, a 10 percent increase in GDP per capita was associated with a 7 percent to 15 percent increase in food imports. In both cases these relationships were statistically of high significance. Similar estimates for advanced developing countries did not prove statistically significant, although the study notes that there was no evidence of a negative relationship between agricultural productivity and food imports.[28]

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[27] James P. Houck, "Foreign Agricultural Assistance: Ally or Adversary," Department of Agricultural and Applied Economics of the University of Minnesota Staff Paper P86-50, November 1986. This study used data from 1983 and 1984. Another study found that the 16 developing countries with the fastest growth in agricultural output between 1961 and 1976 more than doubled their net imports of food staples in that period. See Kenneth Bachman and Leonardo Paulino, *Rapid Food Production Growth in Selected Developing Countries: A Comparative Analysis of Underlying Trends, 1961-1976* (Washington, D.C.: International Food Policy Research Institute, Research Report No. 11, October 1979).

[28] Houck concluded that foreign assistance aimed at advancing agricultural development--especially in the poorer developing countries--was beneficial in general to U.S. farm export interests.

CHAPTER III

HOW U.S. POLICIES AFFECT AGRICULTURE IN DEVELOPING COUNTRIES

The agricultural exports of the United States are increasingly linked to the demand for food in developing countries. As shown in Chapter II, food demand in developing countries increases as incomes rise. Higher incomes in turn often depend on advances in agricultural productivity. For these reasons, a dynamic agriculture in the developing world is likely to be favorable to U.S. farm exports.

Policies of the U.S. government affect agriculture in developing countries in a number of ways--most directly through bilateral economic aid and through U.S. contributions to multilateral development organizations, but also through the spillover effects of U.S. macroeconomic and agricultural policies on world markets. Private groups in the United States--foundations, charities, and agribusiness--often play a key role as well.

WHAT DEVELOPING COUNTRIES NEED FROM ABROAD

Agricultural development requires not only physical and human resources, but also technical and financial assistance from other countries. During early stages of development, foreign assistance comes mainly in the form of governmental aid.[1] At later stages, loans and credits come increasingly from private sources. Table 9 shows how the structure of financial flows to developing countries has shifted over the last three decades. In the early 1960s, when most of the Third World was at an early stage of development, official flows provided almost 60 percent of the financial capital for these countries. During the 1960s and 1970s, private financial flows became the largest source of capital, reflecting a surge in private direct investment and loans to developing countries, although official funding still grew in real absolute terms over this period. With the onset of the debt crisis in the early 1980s, and the subsequent massive withdrawal of new private financing, official development funding again became the primary source of such financial flows. Private financial flows are highly correlated with economic growth in many developing countries. Even though official flows are large, there is little chance of renewed growth in debt-constrained countries without a resurgence in private financial flows.

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[1] The role of foreign aid at various stages of development is described by Helen Hughes, "The Role of Aid and Private Capital Inflows in Economic Development," in Frank Holmes, ed., *Economic Adjustment: Policies and Problems* (Washington, D.C.: The International Monetary Fund, 1987).

So far as the external world is concerned, developing countries have three kinds of needs:

TABLE 9. TOTAL NET FINANCIAL FLOWS TO DEVELOPING COUNTRIES (In percentage shares)

Type of Financing	1961	1970	1975	1980	1985	1986[a]
Official Development Finance	59	46	45	36	60	65
DAC bilateral aid[b]	48	28	17	14	27	31
OPEC bilateral aid[c]	2	10	7	3	4	
Multilateral aid	2	5	7	6	10	11
Multilateral nonconcessional lending	2	3	4	4	10	10
Export Credits	14	13	10	13	4	2
Private Flows	27	41	45	51	37	32
Direct investment	19	18	20	9	9	14
Bank sector	6	15	21	38	16	6
Bonds	--	2	1	1	5	4

SOURCE: Congressional Budget Office, based on data from Organization for Economic Cooperation and Development (Development Assistance Committee), *Development Co-operation: 1987 Report* (Paris: 1988), Table IV-2, p. 51.

a. Provisional.

b. Development Assistance Committee, comprising all members of the Organization for Economic Cooperation and Development except Greece, Iceland, Spain, Portugal, and Turkey.

c. Organization of Petroleum Exporting Countries.

- Assistance enabling them to improve conditions directly in the agricultural sector and rural areas;
- Macroeconomic support; and
- Favorable world market conditions.

Agricultural and Rural Needs

Common needs of the developing countries include: research to develop high-yielding farm technologies; increasing agricultural investment in such areas as irrigation, soil management, and storage facilities; improvements in rural infrastructure, such as transportation and communication; development of more effective marketing and farm credit operations (both private and public); investment in rural human capital through technical training, improved nutrition and health, and better education; training of government policy and support staff; and encouragement of agricultural price policy reforms.

Programs that deal successfully with one of these problems often call for complementary investments in other areas of need. One writer notes:

> [There is a] dynamic interrelationship between technical and institutional change. Technical changes capable of generating large new income streams at relatively low cost have been an essential condition for the success of other agricultural development programs. Similarly, investments in physical and institutional infrastructures have been essential in enabling countries to realize contributions to economic growth opened up by advances in agricultural technology.[2]

The magnitude of the investment required by such a balanced approach in many developing countries increasingly calls for a coordinated general effort, often under the leadership of the World Bank or a consortium of donors.

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[2] Vernon W. Ruttan, "Assistance to Expand Agricultural Production," *World Development*, vol. 14, no.1 (1986), p. 58.

Agricultural needs often differ among countries, or even among regions within a country. Such diversity makes it likely that production techniques and agricultural policies that work in one area will not work in other areas. New crop technologies, for example, may not be transferable--as shown by the inability to transfer high-yielding seeds from Asia to Sub-Saharan Africa. National (and often local) agricultural research facilities need to develop and adapt technologies compatible with local growing conditions.

The Need for Macroeconomic Support

Agricultural development cannot be expected to succeed without a stable economy. Difficulties in the economy are often used to justify measures that discriminate against agriculture, or that delay the investments and policy reforms necessary to help agriculture. Reforms cost money, and policies favorable to agriculture often require compensating those in other sectors who are made worse off. Financial and technical assistance from abroad can help a government carry out comprehensive (rational) policy reforms that encourage agricultural production. Support during periods of economic difficulty can enable government to carry on with its reforms until conditions improve. Support during the adjustment period following a reform may help to reduce political opposition as well as economic hardship--a key factor in many structural adjustment programs in debt-constrained countries. A form of support that should not be overlooked is help in training and educating the staffs of government ministries.

The Need for Favorable World Market Conditions

Most developing economies do not have the financial strength to ride out periods of poor export markets, high import prices, or expensive international credit--a fact made clear in the 1980s by the sustained depression in world commodity prices and the international debt crisis. As export revenues fell and private sources of international financing dried up, developing countries became increasingly dependent on foreign aid and the assistance of international organizations.

LEVERS OF INFLUENCE FOR THE UNITED STATES

The United States government influences agriculture in developing countries through its foreign aid programs. These fall into two broad categories: international security assistance, and development assistance.

Security assistance, which includes both economic and military aid, is given for political or strategic reasons. The principal form of assistance for economic security is the Economic Support Fund, which often gives unconditional support for a wide range of economic policies, as well as grants to finance purchases of U.S. military equipment. Recipients of security assistance include some relatively well-off developing countries--for example, Israel and Egypt, which received more than half of all security assistance in 1988.

Development assistance, on the other hand, is intended to improve the conditions of the world's poor and to meet long-term economic development needs. Aid in this category is provided directly through the Agency for International Development and the Public Law 480 Food Aid program, and also through contributions to multilateral development organizations such as the World Bank. Development aid is distributed among a much larger number of developing countries than is security assistance, with a markedly greater emphasis on agricultural development.

Recent Trends in Foreign Aid

U.S. foreign aid outlays withstood budgetary pressures relatively well from 1976 to 1986--averaging about 1.4 percent of total government outlays (see Table 10). They grew steadily over this period--by almost 200 percent in nominal terms and by about 60 percent when adjusted for inflation. Outlays began to decline in 1987, partly reflecting the effect of a $2.5 billion Economic Support Fund supplemental grant to Israel in 1985 and 1986, but also in response to a general budget tightening. This decline has continued.

Overall trends in foreign aid, however, mask a major realignment in the composition of aid spending. An increasingly large proportion of the aid budget has been spent on international security assistance rather than development assistance. Security assistance increased

TABLE 10. U.S. FOREIGN AID OUTLAYS, 1976-1987

Kind of Aid	1976-1977 Average	1978-1980 Average	1981	1982	1983	1984	1985[e]	1986[e]	1987
				In Millions of Dollars					
Total Foreign Aid[a]	5,609	7,176	9,226	9,188	10,568	12,402	14,800	15,467	11,415
Security Assistance	2,879	4,115	5,095	5,416	6,613	7,924	9,391	10,499	7,106
Military[b]	1,998	2,259	3,042	3,117	3,937	5,050	4,502	5,815	3,640
Economic Support Fund	882	1,856	2,053	2,299	2,676	2,874	4,889	4,684	3,466
Development Assistance	2,730	3,061	4,131	3,772	3,955	4,478	5,409	4,968	4,319
Multilateral[c]	1,085	1,032	1,291	1,301	1,461	1,699	1,763	1,838	1,306
Agency for International Development	989	1,157	1,544	1,524	1,657	1,779	1,929	1,990	2,012
Public Law 480	772	952	1,254	929	992	1,085	1,715	1,095	970
Other[d]	-116	-80	42	18	-155	-85	2	45	31
				As Percentages of Total Foreign Aid					
Security Assistance	51	57	55	59	63	64	63	68	62
Development Assistance	49	43	45	41	37	36	37	32	38
				As Percentages of Total Outlays					
Total Foreign Aid	1.44	1.39	1.36	1.23	1.31	1.46	1.56	1.56	1.14
Development Assistance	0.70	0.59	0.61	0.51	0.49	0.53	0.57	0.50	0.43

SOURCE: Congressional Budget Office.

a. All outlay values include on-budget and off-budget spending, and offsetting receipts. Foreign aid values are standardized to match current budget definitions.

b. Category includes all international security assistance except the Economic Support Fund.

c. Category includes predominantly outlays for multilateral international institutions such as the United Nations, the World Bank, the International Monetary Fund, and the regional development banks.

d. Category includes other development expenditures and receipts, such as the Peace Corps and refugee assistance.

e. The reduction in foreign aid and economic security fund outlays in 1987 compared with 1986 and 1985 reflects the impact of a $2.5 billion supplemental grant to Israel authorized in 1985.

from about half of all foreign aid outlays in the mid-1970s to almost two-thirds in the mid-1980s. In real dollars, security assistance almost doubled from 1976 to 1986, while outlays on development assistance remained roughly constant. Both military and economic security assistance grew rapidly.

Compared with the aid given by other countries, however, U.S. development assistance has declined considerably--falling from about 58 percent of all official development assistance from OECD countries in 1965 to about 30 percent in 1975 and 29 percent in 1986.[3] Japan is expected in the near future to overtake the United States as the world's largest bilateral aid donor.[4] The European Community countries, representing an economy roughly equivalent in size to that of the United States, give almost two-thirds as much bilateral aid. In fact, relative to its gross domestic product, the United States is one of the smallest aid donors. It is still an important force in development policy, but no longer a dominant force. For many developing countries, U.S. development aid is increasingly just one of a number of sources of assistance--a fact that limits U.S. leverage on their policies and narrows the range of aid projects undertaken.

Bilateral U.S. Aid

The foreign economic assistance programs of the United States are administered by the Agency for International Development (AID) in the Department of State. Bilateral assistance includes development assistance; the Public Law 480 program (Food for Peace); and the Economic Security Fund (ESF). In formulating foreign aid policy, AID shares responsibility with other government agencies and with the Congress. AID determines how its own assistance funds will be spent, but develops food aid policy in conjunction with the Department of Agriculture; the State Department has primary responsibility for the direction of ESF policy. The Development Coordination Committee in the executive branch coordinates U.S. development policy.

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[3] See Organization for Economic Cooperation and Development, *Development Co-operation*, various issues. The Development Assistance Committee (DAC) of the OECD monitors development assistance. Official development assistance is defined by the OECD as any aid transaction "administered with the promotion of the economic development and welfare of developing countries as its main objective, and [that] is concessional in character and contains a grant element of at least 25 percent." For the United States, official development assistance includes all development assistance by the Agency for International Development, Titles II and III of P.L. 480, contributions to multilateral agencies, and a substantial portion of the Economic Support Fund. The downward trend described in the text would be even more dramatic if the ESF were excluded.

[4] Although Japan is increasing its foreign economic aid, the dollar value of the aid has been inflated by the appreciation of the yen relative to the dollar. Since most Japanese aid is used to buy Japanese goods and services, an increase in its dollar value does not represent an equivalent real increase in aid. Moreover, for countries whose currencies and/or exports are tied to the dollar, the cost in their own resources of repaying yen-denominated loans rises as the yen appreciates. Japan's increased commitment to foreign economic assistance stems in part from a desire to recycle its current account surplus with the United States and to compensate for its relatively small contribution to its own military defense (limited under the postwar constitution).

The trade policies of the developed countries have a heavy impact on the agriculture of developing countries. Import restraints, such as those imposed by the European Community and the United States against sugar, seriously retard agricultural exports from developing countries. Subsidies to the production and export of farm products in developed countries have a mixed effect--improving the terms of trade for developing countries that import food but worsening them for those that export food. Tariffs and other protective policies by developed countries aimed at keeping out imports of nonagricultural products fall heavily on agriculture in developing countries, since agricultural development is so closely linked to overall economic growth in most of those countries.

The three kinds of economic assistance differ in focus. *Development assistance* is targeted most directly at improving the condition of the world's poor. Although its distribution among countries reflects strategic concerns to a degree, it is mainly oriented toward long-term development goals. However, a considerable portion of program procurement is spent on U.S. goods and services.[5] *Food aid* is used to provide emergency relief following catastrophes and as ongoing development assistance. Food aid can lower the financial burden on recipient countries of importing food to improve nutritional standards, thus freeing up foreign exchange for other types of imports. More than any other form of U.S. bilateral aid, however, food aid also serves to complement domestic U.S. policies--particularly by reducing the burden of surplus production resulting from agricultural price supports. The *Economic Support Fund* is primarily an economic tool in the

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5. Dennis A. Rondinelli, in *Development Administration and U.S. Foreign Aid Policy* (Boulder, Colorado: Lynne Rienner Publishers, Inc., 1987), p. 2, reports that "each year more than 60 percent of foreign aid expenditures purchase American goods and services."

service of U.S. strategic interests. Its spending tends to be concentrated on a few key countries, without much concern for developmental goals. The Agency for International Development attempts, as far as it can, to coordinate the use of these different forms of aid--as well as complementary aid from other donors--into a coherent development strategy on a country-by-country basis.

Development Assistance. The development assistance administered by AID provides a variety of projects and programs in a wide range of developing countries.[6] The guiding principles underlying U.S. policy on development assistance have evolved substantially since its inception over 40 years ago, adapting to changes in foreign economic policy objectives and incorporating the knowledge gained from designing and operating assistance projects (see Box 3). Early U.S. aid strategies assumed that the poor countries would follow the development pattern of the industrialized countries, which meant an emphasis on capital-intensive investment and advanced technology. Dissatisfaction with the results of this approach led in the 1970s to a greater emphasis on serving the "basic needs" of the population in developing countries through projects focused on agricultural productivity, population control, health, nutrition, and education.

Current AID policy is governed by "four pillars" of development administration: policy dialogue with recipients, private-sector initiatives, technology transfer, and institution building. The four pillars approach retains the focus on improving conditions for the poor majority, but aims to do so by placing greater emphasis on encouraging government deregulation and private market activity. It reaffirms a long-standing U.S. commitment to improving institutional capabilities in developing countries, although more emphasis now is placed on institutions in the private sector. Increasing stress is placed on coordinating U.S. assistance efforts with other bilateral donors and with the multilateral development agencies. Within this context, the availability of U.S. aid is increasingly becoming conditional on policy reforms by the recipient governments. For the most part, AID now

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[6] For a historical overview of AID activity, with an emphasis on issues of development administration, see Rondinelli, *Development Administration and U.S. Foreign Aid Policy*. For an overview of current operations, see Agency for International Development, *Congressional Presentation, Fiscal Year 1989, Main Volume.*

BOX 3

MILESTONES IN U.S. BILATERAL DEVELOPMENT ASSISTANCE

The United States launched its first major foreign aid project with the Marshall Plan in 1948. The Marshall Plan transferred billions of dollars of investment capital and technology to Europe to help rebuild its industrial capacity destroyed in World War II. Attempting to build on this success, President Truman announced his "Point Four" program to provide U.S. financial and technical assistance in a similar form to developing countries, especially Asian countries seen as threatened by Communist expansion. U.S. development assistance over the next decade, reinforced by the prevailing theory of economic development, stressed the need for the economic and political modernization of developing countries along the same lines that had proved successful in the United States and other developed countries. Rapid economic growth, spurred by high levels of capital investment and led by an efficient government bureaucracy, was expected to reduce poverty substantially.

By the early 1960s, it became clear that the Western model did not work well in developing countries with no industrial tradition and few skilled workers or government administrators. During the Kennedy Administration, a new approach to development began, taking form gradually over the next two decades. This approach laid more stress on the development needs of a broad range of countries, highlighting Latin America through the "Alliance for Progress," rather than only those countries of special strategic interest to the United States. It allowed a greater role to other bilateral donors and the multilateral development agencies. U.S. funding for development aid was increased, and its administration was consolidated in the Agency for International Development (AID), partly in an attempt to separate development from military assistance. During the 1960s, the agency stressed "institution building" to help recipient countries acquire the capacity to formulate and carry out development projects. In the political discord over the Vietnam War, however, the mandate for foreign assistance weakened and aid funding fell.

A "New Directions" mandate for development began with the Foreign Assistance Act of 1973. Reflecting the assessment that U.S. development assistance had not adequately addressed the needs of the world's poor, it placed more emphasis on rural development than on economic growth. Completing a transition begun in the 1960s, AID projects focused on what were considered the key constraints on grassroots development: raising agricultural productivity through agricultural research, extension programs, land reform, and credit and investment programs; encouraging population control; improving nutrition and health care; and advancing education and human resources. AID projects were designed to be more compatible with local conditions--encouraging the participation of the target groups in the projects--rather than attempting to enforce U.S. standards. Among other accomplishments, AID played a vital role during the 1960s and 1970s in introducing the "green revolution" technologies that led to a substantial advancement in agricultural output in many developing countries. By the mid-1970s, the primary objective of U.S. assistance had shifted fully away from large investment projects and toward providing the "basic needs" of the poor.

During the 1980s, development assistance shifted again in response to the foreign policy priorities of the Reagan Administration and a new set of debilitating macroeconomic problems associated with the debt crisis. AID, following the lead of the international development organizations, become more involved in stressing policy dialogue with recipient countries. The application of AID funds increasingly became conditional on complementary policy reforms by recipient countries, government deregulation, and a greater reliance on the private sector and market forces. After a long hiatus, AID again became involved with the macroeconomic policies of governments, as development in many countries stalled because of the debt crisis.

specializes in small or middle-sized programs targeted at improving the living conditions and earning capacity of the poor, and fortifying the private and public institutional capability of developing countries. Large-scale projects for improving the infrastructure and other purposes are left primarily to the multilateral development banks.

Agricultural development projects have always been a focus of U.S. development aid, partly because of the recognized importance of agriculture in developing countries but also because of this country's long-standing interest and expertise in that sector. Agricultural, rural development, and nutritional projects have accounted for about half of AID's spending over the last two decades--although the relative amounts spent on agriculture have fallen somewhat during the 1980s (see Figure 2). In 1987, one-third of this assistance went to countries in Asia and the Middle East, one-quarter to Latin American and Caribbean countries, and one-fifth to Africa (see Table 11). A considerable amount of other types of spending--on health, population control, education, and training--also benefits farmers in developing countries. In addition, a major new Development Fund for Africa has been authorized for AID, and a substantial portion of it will be spent on agricultural development.

AID's current objectives for its agricultural, rural development, and nutrition programs are to:

- Increase farm and nonfarm employment and incomes to enable low-income households to purchase available food;
- Promote private agricultural marketing and distribution systems for food, for both domestically produced and imported food;
- Encourage market-oriented, efficient, low-cost production of food and other crops on small family farms on a sustainable basis;
- Provide food assistance, including targeted food assistance, to people currently unable to buy food on the market, with particular attention to children and women in low-income families; and

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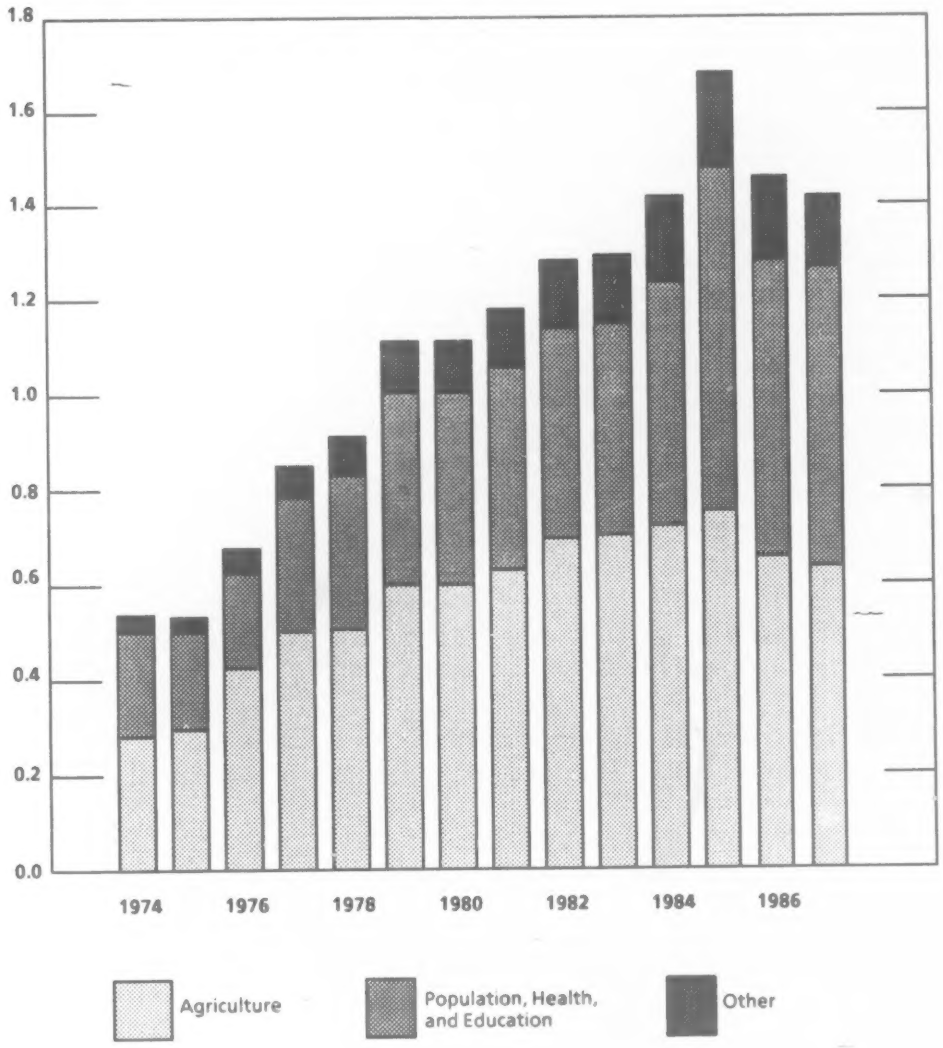
Figure 2.
Agency for International Development Spending by Functional Use, 1974-1987 (In billions of dollars)



SOURCE: Congressional Budget Office, from Agency for International Development.

TABLE 11. DISTRIBUTION OF U.S. BILATERAL ASSISTANCE FOR AGRICULTURE, RURAL DEVELOPMENT, AND NUTRITION, 1987 AND 1989 (Fiscal years, in millions of dollars)

Agency for International Development	1987	1989
Total Budget Request	709.9	461.1[a]
Bureau for Africa	148.0	n.a.
Sudan	23.0	n.a.
Cameroon	13.3	n.a.
Somalia	11.4	n.a.
Zaire	11.1	n.a.
Bureau for Asia and Near East	237.9	174.2
India	60.6	17.3
Bangladesh	40.0	21.2
Indonesia	28.9	29.8
Sri Lanka	19.0	22.8
Philippines	13.9	3.5
Pakistan	13.2	15.0
Thailand	12.2	11.6
Bureau for Latin America and Caribbean	178.8	144.5
El Salvador	38.2	27.7
Honduras	20.9	16.5
Dominican Republic	15.0	6.9
Guatemala	14.5	13.5
Haiti	10.2	11.0
Other	145.2	142.2

SOURCE: Congressional Budget Office, from budget requests of the Agency for International Development, *Congressional Presentation, Main Volume* (for fiscal years 1987 and 1989).

NOTE: n.a. = not available.

[a] Funding for Africa in 1989 is channeled through the Development Fund for Africa, which is not included here. The Development Fund for Africa is budgeted to spend $510 million in 1989, representing an increase in funding for Africa. A significant portion of this amount will be spent on agricultural projects.

o Incorporate sound nutritional principles into the design and implementation of agricultural and rural development activities.[7]

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[7] See Agency for International Development, *Congressional Presentation, Fiscal Year 1989, Main Volume* (1988), pp. 49-50.

Underlying this strategy is the belief that agricultural and rural development provide the key to raising the incomes of the poor majority, which in turn stimulates long-term development. Higher per capita incomes also often lead to higher food imports, a beneficial side-effect for U.S. agriculture.

AID funds a wide range of projects and programs to achieve these agricultural development goals. Some projects aim directly to increase agricultural production--for example, irrigation and other water management projects, and agricultural research and extension. Other projects are aimed at developing agricultural and rural infrastructure, more efficient marketing operations, the health and skills of small farmers, and government policy and administrative capability in the agricultural sector. Policy dialogue, often supported by program funds, is used to stimulate reforms that complement AID projects and further the general AID development strategy in each country. Such reforms include: privatizing the marketing of farm products and farm inputs; reducing import barriers for agricultural inputs and reducing taxes on agricultural exports; lowering overvalued exchange rates; reducing subsidies on food consumption and on agricultural inputs such as fertilizer and pesticides; and reducing controls on borrowing and lending, especially for small farmers and businesses.

No comprehensive assessment of the impact of AID's programs on agriculture exists.[8] Several success stories stand out, however. During the 1950s and 1960s, U.S. policies helped to boost agricultural production in Taiwan and South Korea, paving the way for their subsequent rapid industrial growth. These two countries now have become major importers of U.S. food products. In addition, AID--along with private foundations--played an important role in developing and establishing the high-yielding crop technologies underlying the "green revolution" in Asia, the Near East, and Latin America. Several recent AID projects receive generally high marks, including: agricultural research; health research, especially related to developing and distributing various vaccines and oral dehydration remedies; savings and credit programs for small farmers and businesses; and continuing institutional development programs

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[8] Although AID commonly assesses the effectiveness of its individual programs, it has not offered an overall evaluation of its long-term contribution to agricultural development.

On the other hand, many criticisms have been leveled at AID. The agency has been criticized for attempting to force U.S. technological and cultural standards on developing countries; for being insensitive to the real needs of the poor majority; for cumbersome and ineffectual program administration; and for failing to learn from past failure. Some suggest that U.S. aid causes more damage than good. Overall criticism has been leveled at the emphasis on security objectives underlying U.S. foreign economic assistance policies.

Public Law 480: Food for Peace. The Food for Peace Program distributes food aid to developing countries.[9] The United States has traditionally provided emergency food assistance to countries facing short-term food shortages. It has also used food to achieve various other objectives: to assist economic development, to serve its foreign policy concerns, and to expand the markets for U.S. agriculture abroad. Because of these diverse and often conflicting objectives, food aid has proved controversial both in the United States and in recipient countries.

Created in 1954, P.L. 480 was conceived as a constructive way of disposing of surplus farm commodities and of developing commercial export markets for them. The Food for Peace Act of 1966 shifted the program's emphasis toward promoting economic development in recipient countries. Food aid is increasingly used as a lever to encourage agricultural policy reforms. A continuing tension remains, however, between food aid as a development assistance tool and its use to promote U.S. agricultural exports.

There are two major programs within P.L. 480: Title I, a sales program, and Title II, an emergency aid program. Roughly one-half to two-thirds of all U.S. food aid is sold under the Title I program, which provides concessionary loans to foreign governments, which then purchase U.S. commodities from private suppliers at competitive prices.[10] Recipient governments sell these commodities on domestic markets. AID is increasingly attempting to encourage recipient countries to use the foreign exchange savings resulting from food aid to achieve high-priority development goals. The Title III program, a new and relatively small program called Food for Development, provides an additional incentive for this by allowing countries receiving Title I commodities to write off some of their debt by using the funds raised from sale of those commodities to finance approved development projects (effectively transforming the loan into a grant).

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[9] Several additional small food aid programs exist: foreign donations under the Section 416 program, and the AID Mutual Security program. For a good overview of issues related to the P.L. 480 program, see Charles E. Hanrahan, *Effectiveness of Food Aid: Implications of Changes in Farm, Food Aid and Trade Legislation, Proceedings of a CRS Workshop Held on April 25, 1988*, Congressional Research Report 88-493 ENR (June 1, 1988).

Title II, the other major P.L. 480 program, authorizes commodity donations (grants) for emergency disaster relief, economic development, and various feeding and nutritional programs. These donations are carried out through private voluntary organizations (such as CARE), national governments, cooperatives, and international agencies. Some Title II commodities may be sold by recipient governments to defray food distribution or related development project costs.

The importance of food aid, both as a form of economic assistance and in relation to total U.S. agricultural exports, has declined significantly since the 1960s. The share of food aid in economic assistance fell from about one-third in 1970 to about one-fifth in the mid-1980s. Similarly, the proportion of food aid in U.S. agricultural exports declined from almost one-third during the early 1960s to about one-twentieth in the mid-1980s.[11]

Even though food aid makes up only a small proportion of U.S. agricultural exports, it still plays a significant role in the marketing of several commodities. About half of the dollar value of all food aid in 1987 consisted of wheat and wheat flour. About 16 percent of the value of all U.S. wheat and wheat flour exports in that year consisted of food aid. Similarly, food aid provided a market for about 22 percent of all powdered milk exports, 12 percent of all rice exports, and 57 percent of all soybean oil exports. About 9 percent of all U.S. agricultural exports to developing countries consisted of food aid, including about 41 percent of those to Sub-Saharan Africa.[12]

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[10] Concessionary loan terms, financed by the Commodity Credit Corporation of the Department of Agriculture, typically involve a repayment term of 20 to 40 years, a 10-year grace period, and an interest rate of 2 percent to 4 percent. With these loan concessions, the full cost of Title I commodity sales is estimated to be about 70 percent of the free market price.

[11] See Hanrahan, pp. 38-44.

Food aid (from all sources) now has a much smaller role in supplying imports to most developing countries than in the past, with the notable exception of Sub-Saharan Africa (see Table 12). While food aid fell from 39 percent of the food imports of developing countries during the early 1960s to only 8 percent in 1981, it became increasingly important for Sub-Saharan African countries. It is in the small African economies that food aid has the greatest potential impact, either positively or negatively.

Food aid helps countries to obtain food without using up their foreign exchange resources. Whether it has a positive effect on the development of their economies depends on how the commodities and the foreign exchange are used. Emergency food aid during times of severe food shortage fills an obvious humanitarian need, and also reduces the need to maintain stockpiles of food (or reserves of foreign exchange) as insurance against calamities. Too much food aid, however, can strain local distribution channels and swamp local markets, depressing prices for local farmers. Such consequences discourage farmers from replenishing the local food supply and rebuilding farm incomes, in some cases prolonging the emergency and creating a perverse need for more food aid.

Long-term development is best served if a steady amount of food aid, supported by a long-term commitment from the donors, is sold on domestic markets in amounts that do not significantly reduce incentives for local farmers. Food aid is least likely to disrupt markets when it is targeted at groups who are unable to purchase enough food to meet minimum nutritional standards.

Both the intent and the effect of U.S. food aid have been widely criticized. Some developing countries complain that Title I sales are not really aid, since much of this food must eventually be paid for in dollars by the recipient country (Title III is designed to relieve the

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[12] Department of Agriculture, *Foreign Agricultural Trade of the United States: Calendar Year 1987 Supplement* (1988). The political nature of some food aid is suggested by the fact that Egypt received more of it than all the Sub-Saharan African countries combined in 1987.

TABLE 12. COMMERCIAL CEREAL IMPORTS, AND FOOD AID RECEIVED BY DEVELOPING COUNTRIES, BY REGION AND INCOME GROUP, SELECTED PERIODS

(In millions of metric tons)

Region or Income Group	Year	Commercial Imports	Food Aid[a]	Total Imports	Share of Food Aid in Total Imports (In percent)
Total, Developing Countries	1961-63	18.5	11.6	30.0	39
	1976-78	55.1	8.0	63.0	13
	1981	89.5	7.6	97.2	8
		By Region			
Asia	1961-63	11.4	5.7	17.1	33
	1976-78	22.2	4.2	26.4	16
	1981	33.9	2.5	36.4	7
Latin America	1961-63	3.7	1.9	5.6	34
	1976-78	14.2	0.4	14.6	3
	1981	22.5	0.6	23.0	2
North Africa and Middle East	1961-63	1.9	3.9	5.7	67
	1976-78	14.6	2.5	17.1	14
	1981	26.4	2.5	29.0	9
Sub-Saharan Africa	1961-63	1.5	0.1	1.6	8
	1976-78	4.1	0.9	4.9	18
	1981	6.7	2.0	8.8	23
		By Income Group			
High-Income Developing Countries	1961-63	5.6	3.1	8.7	35
	1976-78	21.6	1.0	22.6	4
	1981	40.3	0.5	40.8	1
Middle-Income Developing Countries	1961-63	9.4	3.2	12.6	25
	1976-78	26.7	2.7	29.3	9
	1981	43.4	3.4	46.8	7
Low-Income Developing Countries	1961-63	3.4	5.3	8.7	61
	1976-78	6.8	4.3	11.1	39
	1981	5.8	3.8	9.6	40

SOURCE: Barbara Huddleston, "Trends in Trade and Food Aid," in J. Price Gittinger, Joanne Leslie, and Caroline Hoisington, eds., *Food Policy: Integrating Supply, Distribution and Consumption* (Baltimore: The Johns Hopkins University Press, 1987), Table 15-2, p. 226.

NOTE: Data for ranges of years are annual averages.

a. Food aid totals for 1976 to 1978 and 1981 do not include approximately 700,000 metric tons reported by the Food and Agriculture Organization, most of which went to Indochinese countries and Portugal.

repayment pressure). Also, the extent to which Title I aid is available depends on conditions in domestic U.S. agricultural markets: there is a tendency for the quantity of Title I food aid to fall when international markets tighten and prices rise, at the very time that developing countries most need aid. The short-term commitment of most food aid further limits its effectiveness as a tool to assist long-term development. From this point of view, food aid looks like an export subsidy to help U.S. farmers dispose of surplus stocks. Moreover, even though the Agency for International Development is required to certify or state that food aid does not discourage food production in the recipient country, such effects are difficult to avoid in practice.

The Economic Support Fund. This fast-growing program is explicitly a foreign-policy tool--designed primarily to support U.S. security, political, and economic interests rather than to meet the developmental needs of recipient countries.[13] Although the ESF often is used to promote development, such support is predicated upon the achievement of broader foreign-policy objectives. The ESF accounted for about 42 percent of all U.S. economic assistance between 1981 and 1987, and more than half of U.S. bilateral economic aid.

The popularity of the ESF stems from its flexibility. More than half of its aid is distributed in cash (U.S. dollars), providing budgetary and balance-of-payments support to recipient countries. The U.S. government places few requirements on the use of these cash transfers, and often has little knowledge of how the funds are spent. The government can reallocate this kind of aid quickly in response to changing political and economic conditions, and can use it as a lever to encourage policy reforms in recipient countries. The ESF program allows recipients to spend the funds in a manner most conducive to growth (all other things equal, untied aid is a more efficient way of transferring income than is aid tied to specific uses). Recipients may, if they wish, use these funds to alleviate some of the constraints on agricultural and economic development that were detailed in Chapter II. The ESF also provides project aid, again administered more flexibly, and with less emphasis on developmental goals, than other forms of bilateral assistance.[14]

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[13] The ESF program is directed by the U.S. Department of State and administered by its development agency, AID. For additional information on the ESF, see Larry Q. Nowels, "An Overview of the Economic Support Fund," Congressional Research Service, *CRS Report 88-284 F* (April 1, 1988); and U.S. General Accounting Office, *Foreign Aid: Improving the Impact and Control of Economic Support Funds*, GAO/NSAID-88-182 (June 1988).

ESF aid has always been concentrated on a few countries, reflecting U.S. geopolitical interests. During the 1950s, the ESF supported the rearming of Europe and the strengthening of the economies of Taiwan, South Korea, and Indochina. Indochina dominated funding throughout the 1960s and early 1970s, but was replaced by Israel and Egypt after 1975. In 1987, about 90 percent of all ESF spending went to twelve countries, with Israel and Egypt together accounting for 51 percent and four Central American countries for another 17 percent.[15] A significant amount of ESF aid is used to reimburse countries where the United States has military bases.

Little is known about the impact of ESF aid on economic development. Given its largely strategic mandate, the government has not done much to articulate developmental goals for the ESF or to assess its developmental effects. It is inherently difficult to measure the economic impact of cash transfers when their specific uses are not known, or to judge how effectively such transfers have been used to induce policy reforms.[16] Korea and Taiwan, major recipients of both ESF and development assistance during the 1950s, have developed impressively. The same cannot be said of more recent recipients--Egypt, Israel, the Philippines, and Pakistan. Some critics note that ESF aid allows governments to delay making needed, but possibly disruptive, policy reforms. Also, its high concentration on a few countries--many of which are already relatively well off--limits its impact to a small segment of the developing world.

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14. ESF also delivers aid through a third program--the Commodity Import Program (CIP). The CIP dedicates funds for importing U.S. goods during periods of foreign exchange shortage. CIP funding has fallen from 19 percent of all ESF spending in 1979 to just 9 percent in 1987. This program is less popular than cash transfers because U.S. products often are more expensive, and cost more to ship (one-half of CIP commodities must be shipped on U.S. flag vessels) than imports from other countries. This additional cost reduces the quantity of goods that can be purchased with a given amount of aid.

15. Major recipients of the $3.9 billion of ESF appropriations in 1987 were, in millions of dollars: Israel, $1,200; Egypt, $820; El Salvador, $281; Pakistan, $250; the Philippines, $235; Costa Rica, $142; Honduras, $132; Guatemala, $115; Jordan, $111; Turkey, $100; Portugal, $65; and Ireland, $35. For a complete survey of U.S. economic and military assistance obligations, see Agency for International Development, *Congressional Presentation, Fiscal Year 1989, Main Volume*.

16. The General Accounting Office, acknowledging the difficulties of evaluating the developmental impact of ESF aid, has identified several recent "success and failure stories." See *Foreign Aid*, pp. 26 and 27.

Multilateral Aid

The United States also provides economic assistance to developing countries through the multilateral development agencies (MDAs) such as the World Bank and the regional development banks. The advantages of funneling aid through multilateral agencies rather than bilaterally are threefold: the administration of multilateral aid tends to be less politically motivated; MDAs in many cases can provide technical and financial assistance more efficiently than bilateral aid; and multilateral aid mobilizes resources from all developed countries and from private financial markets, expanding the amount of potential assistance.

MDAs channel financial assistance to developing countries in two ways: by collecting contributions, primarily from developed countries, and redistributing them as grants and concessional loans to the poorest developing countries; and by borrowing funds from private financial markets and relending them at premium, but nonconcessional rates, to a broad range of developing countries. The effect of nonconcessional lending, which is primarily supplied by the World Bank and the regional development banks, is to give developing countries preferred access to world bond markets. Many developing countries are not able to raise their own funds on these markets.[17]

The importance of the multilateral agencies has grown substantially over the last three decades. Net financial flows to developing countries from multilateral agencies have increased from 4 percent of all flows in 1960-1961 to 21 percent in 1986 (see Table 9). About one-third of all official development finance (and all concessional aid) is now provided by multilateral agencies. Multilateral aid continued to rise during the 1980s along with bilateral aid, compensating in part for the sharp decline in private lending to developing countries.

The World Bank group is the largest multilateral donor, providing about half of all multilateral official development finance in 1986, and about one-third of all multilateral concessional aid through the

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[17] The World Bank and the regional development banks sell their bond issues on international financial markets at premium prices. The World Bank, for example, has never defaulted on a loan. It has a large capital stock supplied by member contributions, much of which is callable capital that would become available should a major default occur.

International Development Association (see Table 13). The United Nations development agencies provide about another one-third of all concessional assistance. The regional development banks also provide concessional aid, but in differing degree. The Asian Development Bank and the African Development Bank provide about one-half of all their loans on a concessional basis, but the Inter-American Banks make only about one-fifth of their loans on a concessional basis.

The role of the MDAs has grown for several reasons, among them the desire to depoliticize economic assistance, to spread the burden of aid contributions among many countries, and to provide such aid as effectively as possible. The MDAs operate as independent agencies, directed by representatives of their member countries. Aid channeled through the MDAs is meant to be disbursed in a relatively apolitical way according to the needs and capabilities of the recipient countries and in the framework of an objective development strategy. In practice, the developed countries--particularly the United States--have considerable influence over how most MDAs operate. The United States, as the largest overall contributor to MDAs, has an effective veto over all World Bank (and International Monetary Fund) activities, although the veto is rarely used. It has similar power in concert with other developed countries over most of the other MDAs. MDAs represent, to a substantial extent, Western (and United States) attitudes and interests, as witnessed by the recent use by the United States of the IMF and World Bank to attempt to alleviate the debt crisis--in ways often unpopular with developing countries. Nevertheless, the MDAs function in a less partisan way than does most bilateral assistance.

MDAs also can increase the amount of aid available to developing countries by providing financial intermediation services. MDAs borrow, and lend, far in excess of the capital stock contributions of their members. With decades of experience behind them, the MDAs have become increasingly effective in providing development aid. They are able to provide a larger and more effective flow of resources to a wider range of developing countries per dollar of member-country contributions than can most bilateral aid programs.

TABLE 13. FINANCIAL ASSISTANCE BY MULTILATERAL INSTITUTIONS (Net disbursements in millions of U.S. dollars at current prices and exchange rates)

	Total Aid			Concessional Aid[a]			Current U.S. Influence		
Institution	1970-1971	1980	1986	1970-1971	1980	1986	U.S. Voting Power (Percent)	Largest Vote Bloc	Effective Veto Power
World Bank Group	872	511	8,749	225	1,650	3,331	n.a.		
International Development Association	225	1,543	3,327	225	1,543	3,327	18.1	Yes	Yes
World Bank[b]	647	3,568	5,422	--	107	4	18	Yes	Yes
Regional Development Banks[c]	140	1,563	2,841	3	571	971	n.a.		
Inter-American Development Banks	104	893	1,507	--	326	283	34.7	Yes	No
Asian Development Bank	32	477	780	3	149	416	12.4	No	No
African Development Bank	4	193	554	--	96	272	5.5	No	No
International Fund for Agricultural Development	0	54	286	--	54	286	n.a.	n.a.	n.a.
United Nations[d]	529	2,487	3,052	529	2,487	3,052	n.a.	Yes	No
European Community	242	1,318	1,849	208	1,061	1,659	n.a.	n.a.	n.a.
Other[e]	220	2,105	481	219	1,967	173	n.a.	No	No
Total	2,003	12,638	17,258	1,184	7,790	9,472	n.a.	n.a.	n.a.

SOURCES: Congressional Budget Office, based on Organization for Economic Cooperation and Development, *Development Co-operation*, 1987 Report p. 204; various reports by the National Advisory Council on International Monetary and Financial Policies; the World Bank Annual Report (1988).

NOTE: n.a. = not applicable.

a. Concessional aid is defined as development aid with a grant element of at least 25 percent.

b. Category includes the International Financial Corporation.

c. Data for the regional development banks include their concessional fund operations.

d. The United Nations (UN) group includes the World Food Program, the UN High Commissioner for Refugees, the UN Relief and Works Agency, the UN Children's Fund, UN Technical Assistance, and the UN Fund for Population Activities. The United States is the largest contributor to the UN economic system in general.

e. Category includes the Arab/OPEC funds and the International Monetary Fund Trust Fund.

The MDAs devote a considerable proportion of their assistance to agricultural development. In 1983, the World Bank Group was responsible for about 40 percent of all official development financing of agriculture. Averaged over 1985 and 1986, overall MDA aid to agriculture was more than three times greater than similar assistance provided by U.S. bilateral programs, which amounted to just 14 percent of the total aid flow. An increasingly large proportion of aid, and of agricultural aid in particular, has been flowing to Sub-Saharan African countries.

The multilateral agencies recently set forth a broad strategy for furthering agricultural development in low-income countries, with a special emphasis on Sub-Saharan African countries.[18] The strategy emphasizes the need to design feasible national programs of agricultural and rural development, consisting of comprehensive food-policy "packages" that efficiently direct additional resources to those sectors. It lays stress on improving small-holder productivity in food crops. Achieving this goal will require progress along a wide front: in the kind of rain-fed production that predominates in Sub-Saharan Africa, employing as far as possible "appropriate" low-resource production techniques; in marketing operations; in rural skill levels, and in rural employment and income in general; in the expertise of national and local government staff; in agricultural credit programs with strong cost-recovery characteristics; and in the development and control of water resources.[19]

MDAs have funded major projects for the production of food and agricultural commodities for export in many developing countries. The report summarized above suggested that export-oriented projects should take into account the possible effect on world commodity markets if low-income developing countries increase their exports.

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[18] Reported in Organization for Economic Cooperation and Development, *Development Co-operation, 1986 Report* (Paris: 1987), pp. 137-139.

[19] This agenda conforms generally to the objectives of the Agency for International Development in its agricultural development efforts.

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